Commission of the European Communities

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INPUT-OUTPUT AND ENERGY DEMAND MODELS FOR IRELAND

Data collection report

Part I: Explor

Part II: EDM

Report

EUR 6770 EN

Blow-up from microfiche original

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EC Energy Modelling, Level II, Phase II
E.W. Henry and S. Scott

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E.W. Henry

Part I: Explor

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Any errors remaining in the Report are the sole responsibility of the author.

PART I EXPLOR (Task 2.1.1)

Introduction

In presenting the EXPLOR data for Ireland, we follow the listing of exogenous data-sets used by Battelle on pages 82-87 of document XII/515/77 and forming part of the "User's Guide" section of Chapter VIII of that document.

There are 32 exogenous data-sets in all, grouped into three EXPLOR blocks and a further block containing five sets of required parameters. The data-sets, where presented in tables, are numbered serially, but the title of each gives its T-number within the EXPLOR list of tables as given in document XII/515/77: thus we hope to avoid confusion in identifying data-sets. Some of the sets do not require tabular presentation and are given in the text but are always identified by their T-numbers.

The full 32 sets of exogenous data are shown only for 1974, since some sets are repeated for 1980 and 1985, either because they are indicative (e.g. "yes or no") in their nature, or because we have been unable to make genuine revisions, through lack of information. Generally we show the 1980 and 1985 data-set corresponding to that of 1974 as close as possible to the latter.

A minimum amount of important comment is given in the main text, to be read along with the tabular data-set. Background information and computer soft-ware are given in the form of appendices, at the end of the text and tables. These tables of exogenous data have fairly detailed descriptive headings, so as to be clearly explained without having to refer to text or appendices.

Four sets of exogenous data are of their nature preliminary and subject to revision after application of EXPLOR computations to all of the data for a year. These four sets are: exports (T 36), imports (T 37), price indices of domestic production (T 87), gross profit margins (T 94). Appendix 8 shows computed

results for 1980 and 1985 derived from the values of those four data sets, as given in this Report, and discusses the 1980 figures, with suggestions for possible revisions of some prices and profits.

We have followed instructions to use the 35-sector EXPLOR model listed in Table 1 of XII/515/77. We have used the 23 investing sectors indicated in Table 3 of the same document. Our price indices are based on unity for 1970. There is a one-to-one correspondence between the household consumption commodities and the EXPLOR sectors. Thus, in summary, n=35, m = 35, k = 23.

BLOCK I: HOUSEHOLD CONSUMPTION (8 data sets)

The following scheme sets out the 8 data-sets required for the EXPLOR Household Consumption block.

Table Number	Dimension rows x cols.	Unit	Symbol	Definition
T 76	1 x n	index	p_m	Nominal price indices for imported commodities. Base year 1970 has values 1.0
T1	(m+1)x n	%	H	Transition matrix between private consumption commodity sectors and spending function classification. The sum of each row = 100.0
T 19	1 x m	%	Θ	Private consumption price adjustment ratio of spending functions Coefficients are usually set equal to 1.0
T 70	1 x 1	Mio	δ	Population, in millions of persons
T 22	1 x m		c	Committed consumption by spending function, vector of parameters of comm, expend., per capita, of the spending function
T 17	1 x m		b	Supernumary income allocation ratios by spending function Sum of elements = 1.0
T 71	1 x 1	Mio	$i' \bar{q}$	Private consumption (total), at constant prices
T 100	(m+1)x1	Mio	$\bar{q}$	Adjustment vector (all components but the (m + 1) th are zero. The (m+1) th element is the adjustment cell for the LES

Both m and n have the value 35, thus there is a one-to-one correspondence between the elements of vectors c and b and the EXPLOR sectors.

Table 1 shows T76 results for 1974, 1980 and 1985. These import price indices are based on unity for 1970; they are not shown for EXPLOR sectors 10. to 13., 18., 31 and 34., which do not have imports; they could be set at unity for these sectors, to avoid computer problems arising from division by zero. The Central Statistics Office supplied the basis for many of the 1974 results. All estimates shown for 1980 and 1985 are either linear extrapolations of the price movements between 1969 and 1974, or modifications of such extrapolations.

The transition matrix T1 between private consumption and spending functions appears as Table 1A. It has the same values for 1974, 1980 and 1985. Row 36, the adjustment row, has all zeros. The sum of entries in each other row is 100 per cent. In effect, each row of T1 shows household consumption at purchaser prices (100 per cent) broken down into a producer value and a trade margin (sector 34, Distribution). For example, row 1. agriculture etc. shows that the private consumption of such products contains 78.3% at producer prices and a distribution margin of 21.7% of the total consumer cost.

Table 1: IRELAND, T 76, NOMINAL PRICE INDICES FOR IMPORTED COMMODITIES BASED ON 1.0 FOR 1970

EXPLOR Sector	Import price T 76 for 1974	T 76 for 1980	T 76 for 1985
01. Ag/for/fish	1.501	2.6	3.7
02. Meat etc.	1.969	3.4	4.9
03. Dairy	1.559	2.7	3.8
04. Other food	1.816	3.1	4.5
05. Drinks	1.711	2.9	4.2
06. Tobacco	1.926	3.4	4.8
07. Coal	2.348	4.5	6.8
08. Coke	1.586	3.1	4.6
09. Petrol	4.305	8.3	12.5
14. Ferrous metals	1.8	3.1	4.4
15. Non-ferrous	1.837	3.1	4.5
16. Metal products	1.371	2.4	3.4
17. Build. mats.	2.408	4.2	5.9
19. Chemicals	1.713	2.9	4.2
20. Text. & clothing	1.415	2.4	3.5
21. Leather & footwear	1.685	2.9	4.2
22. Wood & furniture	1.984	3.4	4.9
23. Paper & printing	1.633	2.8	4.0
24. Plastics & rubber	1.484	2.6	3.7
25. Other manufactures	1.414	2.4	3.5
26. Ag. + indus. mach.	1.707	2.9	4.2
27. Office etc. mach.	1.707	2.9	4.2
28. Electrical goods	1.687	2.9	4.2
29. Motor vehicles	1.411	2.4	3.5
30. Other transport equipment	1.420	2.4	3.5
32. Maritime, air, aux.	1.579	2.5	3.5
33. Communications	1.547	2.4	3.4
35. Services	1.667	2.7	3.7

The consumption price adjustment data-set T 19 does not formally require a table as each of its 35 elements has the value 1.0. The population in millions of persons, T 70, has the values 3.086 for 1974; 3.299 for 1980 and 3.478 for 1985, the latter two figures being estimates.

The committed consumption per capita at 1970 prices, T 22, is shown as part of Table 2. The supernumerary income allocation ratios, T 17, are shown as the second part of Table 2. Both T 22 and T 17 have 35 elements, corresponding exactly with the EXPLOR sectors. The same numerical results are to be used for 1974, 1980 and 1985. The estimation of the b and c parameters (T 17 and T 22 respectively) was stopped after 300 iterations, as the five-year data, for 1970 to 1974, do not warrant excessively refined estimation. Appendix One shows the background to the Table 2 results, including the computer programme used for the iteration.

The largest positive supernumerary ratio, 0.40, is for textiles and clothing; other large positive ratios are those of drinks (0.18), petroleum (0.15), meat etc (0.13) and other food (0.11). Of the seven negative ratios, only three are non-negligible, namely those of services (-0.39), dairy products (-0.06) and agriculture etc. (-0.025). The large negative ratio for services is difficult to explain; it might arise from under-estimation of output of services, or from faulty price deflators, or from a genuine real per capital reduction. For EXPLOR work, column (3) values are used; these have negative entries set at zero and all positive entries scaled down, to add to unity.

The total private consumption at 1970 prices, T 71, has values 1308 for 1974; 1581 for 1980; and 1828 for 1985, the unit being £ million. Appendix

TABLE 1A: IRELAND, T1, Transition Matrix between Private Consumption Commodity Sectors and Spending Function Classification, for 1974, 1980, 1985

EXPLOR Sector, Row of T1	Diagonal Column Entry Per cent	Column 34, Distribution entry Per cent	Sum of Row entries Per Cent
1. Ag. etc.	78.3	21.7	100
2. Meat etc.	93.4	6.6	"
3. Dairy	89.9	10.1	"
4. Other food	84.4	15.6	"
5. Drinks	78.7	21.3	"
6. Tobacco	90.0	10.0	"
7. Coal + peat	87.8	12.2	"
8. Coke	70.0	30.0	"
9. Petroleum	92.6	7.4	"
10. Electricity	100.0	nil	"
11. Townsgas	"	"	"
12. Radio-active	"	"	"
13. Water	"	"	"
14. Ferrous	77.3	22.7	"
15. Non ferrous	75.0	25.0	"
16. Metal prods.	84.4	15.6	"
17. Build. mats.	66.7	33.3	"
18. Construction	100.0	0.	"
19. Chemicals	88.3	11.7	"
20. Textiles + Cloth.	83.7	16.3	"
21. Leather + footwear	80.0	20.0	"
22. Wood + furn.	82.8	17.2	"
23. Paper + print	83.5	16.5	"
24. Plast. + rubber	83.3	16.7	"
25. Other manuf.	81.2	18.8	"
26. Ag. + indust. mach.	91.9	8.1	"
27. Office mach.	91.2	8.8	"
28. Elect. goods	82.9	17.1	"
29. Motor vehs.	80.4	19.6	"
30. Other trans. equip	95.2	4.8	"
31. Inland transport	100.0	nil	"
32. Mar/Air/Aux.	"	"	"
33. Communications	"	"	"
35. Services	"	"	"
Row 36.	nil	nil	nil

Two explains how consumption and other final demands were projected to 1980 and 1985.

T 100, the adjustment for the Linear Expenditure System, is zero. This results from the definitions used: any specified consumption aggregate is fully accounted for by the committed amounts (scaled up for population numbers) and the patternisation of the residue by the supernumerary ratios, which sum to unity.

Table 2: Ireland, T 22, COMMITTED CONSUMPTION PER CAPITA AT 1970 PRICES; and T 17, SUPERNUMERARY RATIOS; TO BE USED FOR 1974, 1980, 1985

EXPLOR Sector	T 22 Committed consumption per capita £ (c) (1)	T 17 Supernumerary ratios adding to unity: Before adjustment (b) (2)	After adjustment (b) (3)
01. Ag/for/fish	27.4673	-.024907	0.
02. Meat, etc.	20.2465	.133906	.089 816
03. Dairy	13.2410	-.058981	0.
04. Other food	37.0836	.110427	.074 068
05. Drinks	33.8835	.177273	.118 904
06. Tobacco	24.4939	.068938	.046 240
07. Coal & peat	4.5417	.006655	.004 464
08. Coke	0.2758	-.003822	0.
09. Petroleum	9.7098	.152760	.102 462
10. Electricity	7.3163	.040314	.027 040
11. Towngas	1.5148	.000267	.000 179
12. Radio-active	nil	nil	nil
13. Water	0.9847	.003875	.002 599
14. Ferrous metals	0.3844	-.000336	0.
15. Non-ferrous	0.2079	.000626	.000 420
16. Metal prods.	5.7857	.019314	.012 955
17. Building mats.	0.1406	.000840	.000 563
18. Construction	nil	nil	nil
19. Chemicals	6.0274	.089394	.059 960
20. Textiles & Clothing	25.2790	.396283	.265 806
21. Leather & footwear	5.9686	.022793	.015 288
22. Wood & furn.	4.3537	.064639	.043 356
23. Paper & Print	7.4817	.071134	.047 712
24. Plastics + rubber	4.9468	.037128	.024 903
25. Other manuf.	4.5923	.020925	.014 035
26. Ag. + indust. m.	1.3496	.000871	.000 584
27. Office etc. mach.	0.9998	.001181	.000 792
28. Electrical goods	8.5992	.035970	.024 127
29. Motor vehs.	12.4898	.032260	.021 638
30. Other transp. equip.	0.5206	.002940	.001 972
31. Inland transp.	5.2102	-.006908	0.
32. Mar/air/aux.	2.0592	.000174	.000 117
33. Communications	3.0207	-.003965	0.
34. Distribution	nil	nil	nil
35. Services	76.7872	-.391968	0.
Total (sum of above)	356.9633	1.000000	1.000000

BLOCK II: FINAL DEMAND - PRODUCTION (8 data-sets)

The following scheme sets out the 8 data-sets required for the Final Demand-Production block.

Table Number	Dimension rows x cols.	Unit	Symbol	Definition
T2	k x n	%	K	Investment allocation matrix; sum of each row = 100.0
T30	1 x n	Mio	u*	Dwellings (exogenous investment commodities for dwellings and scrap and certain tax adjustment for investment)
T60	1 x k	Mio	$\bar{u}$	Investment by sectors, at constant prices
T 35	1 x n	Mio	s	Changes in stocks, at constant prices
T 33	1 x n	Mio	g	Government spending by commodity sectors (at constant prices)
T 36	1 x n	Mio	x	Exports at constant prices
T 37	1 x n	Mio	m	Imports, at constant prices, with negative signs
T 3	n x n		A	Direct technical coefficient matrix

Table 3 shows T2 results for 1974, with k having a value 23. Tables 4 and 5 contain corresponding results for 1980 and 1985, respectively. The Central Statistics Office provided much background data, including guideline totals for sector aggregates; many smaller items, however, had to be allocated fairly arbitrarily to the purchasing sectors. The best figures relate to manufacturing sectors, for which the annual census of industry obtains amounts of purchased capital equipment and type (vehicles, plant and machinery, buildings, land, other fixed assets).

The T 2 results for 1980 and 1985 were done by a rudimentary RAS procedure. The 1974 T2 proportionate structure of each investing sector was used to give an initial capital formation vector, by applying these structures to estimated sector outputs for 1980 and 1985, at 1970 prices. Rescaling was made, to match the separately - estimated capital formation vector. The sector aggregates finally chosen are shown in Table 7 below.

TABLE 3: IRELAND, T 2, INVESTMENT ALLOCATION MATRIX FOR 1974 at 1970 PRICES

Purchasing Sectors ↓ / Producing Sectors Percentages of Total →	(1) Ag + Forest	(16) Metal	(17) Build. Mats	(18) Construction	(20) Text. + Cloth	(22) Wood + Furn	(24) Plastics, Rubber	(25) Other Manuf.	(26) Non-elect. mach.	(27) Office Mach + prec.	(28) Electr. Mach.	(29) Motor Vehs.	(30) Other transp. equip.	Total	Sectors
	Percentages														
(1) Agr, For. Fish	9.58	8.93		26.12					31.02		3.23	18.28	2.84	100.00	(1)
(2) Meat & Milk		7.19		35.08		0.87			30.77		14.76	7.19	4.14	100.00	(2)
(3) Other food; drink, tobacco		9.73		14.83					41.62	11.81	7.89	8.52	5.60	100.00	(3)
(4) Coal, coke, peat		5.91		51.16					25.33	5.09	4.84	0.57	7.10	100.00	(4)
(5) Oil and gas		86.67		6.67									6.66	100.00	(5)
(6) Elec. Towngas, Water		5.99		60.06					13.35	1.30	17.98	1.32		100.00	(6)
(7) Iron & Steel		10.84		8.76					46.35		8.76	6.30	18.99	100.00	(7)
(8) Non-ferrous		7.61		28.26					32.46		6.16	11.15	14.36	100.00	(8)
(9) Building materials		6.86		23.03					29.38		11.48	21.77	7.48	100.00	(9)
(10) Chemicals		11.34		7.33				3.40	48.51	9.76	9.21	3.92	6.53	100.00	(10)
(11) Metal Goods		11.11		7.79				3.39	47.49	9.54	9.01	5.28	6.39	100.00	(11)
Sectors	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total	Sectors
(12) Non-elec. + elec. mach.		10.08		16.61				3.45	43.10	8.66	8.17	4.14	5.79	100.00	(12)
(13) Vehicles & Oth. Trs. equip.		3.98		54.61					17.09	3.49	3.24	11.45	6.14	100.00	(13)
(14) Textiles & Clothing		8.89		21.42				3.51	37.98	7.63	7.21	8.27	5.09	100.00	(14)
(15) Leather footwear		8.77		16.36					37.43	7.59	7.08	14.17	8.60	100.00	(15)
(16) Wood, Furn., Oth. Manuf.		4.68		40.21				7.67	19.88		3.79	21.09	2.68	100.00	(16)
(17) Paper, Printing		8.18		25.03			3.50		34.95	7.02	6.65	9.99	4.68	100.00	(17)
(18) Rubber, plastics		11.00		9.64				3.42	46.96	9.45	8.91	4.29	6.33	100.00	(18)
(19) Construction		26.67		6.23					60.05	0.82		2.97	3.26	100.00	(19)
(20) Distribution		7.46	1.75	18.50	7.01	3.86	2.80	0.07	7.01	12.29	2.80	30.42	6.03	100.00	(20)
(21) Transport		6.92		32.89		1.67	0.96	0.96	29.61	5.95	5.61	11.44	3.99	100.00	(21)
(22) Communications				93.41								6.59		100.00	(22)
(23) Services		3.14	0.68	60.92	2.00	2.94	0.49	0.09	4.58	13.24	2.06	9.02	0.84	100.00	(23)
Sectors	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total	Sectors

TABLE 4: IRELAND, T2, INVESTMENT ALLOCATION MATRIX FOR 1980 at 1970 PRICES

Producing Sectors → / Percentage of Total / Purchasing Sectors ↓	(1) AGRIC + FOREST	(16) METAL	(17) BUILD. MATS.	(18) CONSTRUCTION	(20) TEXT. + CLOTH.	(22) WOOD + FURN.	(24) PLASTICS, RUBBER	(25) OTHER MANUF.	(26) NON-ELECT. MACH.	(27) OFFICE MACH. + PREC.	(28) ELECTR. MACH.	(29) MOTOR VEHS.	(30) OTHER TRANSP. EQUIP.	Total	Sectors
(1) Ag., for., fish.	8.22	8.79		27.24					28.71		3.03	21.09	2.92	100.00	(1)
(2) Meat + milk		7.09		36.72		1.15			28.60		13.86	8.34	4.24	100.00	(2)
(3) Other food, drink, tob.		9.69		15.61					38.90	12.55	7.47	9.96	5.82	100.00	(3)
(4) Coal, coke, peat		5.73		52.87					23.57	5.41	4.46	0.64	7.32	100.00	(4)
(5) Oil and gas		81.82		9.09									9.09	100.00	(5)
(6) Elect., townsgas, water		5.84		62.30					12.28	1.37	16.70	1.51		100.00	(6)
(7) Iron + steel		10.99		8.79					45.06		7.69	7.69	19.78	100.00	(7)
(8) Non-ferrous		7.59		20.37					30.00		5.63	12.81	14.69	100.00	(8)
(9) Building mats.		6.59		29.72					26.80		10.53	24.74	7.62	100.00	(9)
(10) Chemicals		11.55		7.91				2.78	40.56	10.66	8.94	4.67	6.93	100.00	(10)
(11) Metal goods		11.30		8.98				2.79	45.36	10.37	8.72	6.31	6.77	100.00	(11)
SECTORS	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total	SECTORS
(12) Non-elec. + elec. mach.		10.22		17.77				2.83	41.02	9.35	7.83	4.89	6.09	100.00	(12)
(13) Veh. + other trans. equip.		3.99		55.55					15.39	3.42	2.85	12.82	5.98	100.00	(13)
(14) Text. + clothing		8.80		22.62				2.87	35.72	8.26	6.82	9.70	5.21	100.00	(14)
(15) Leather + footwear		8.48		16.95					35.58	8.48	6.78	15.25	8.48	100.00	(15)
(16) Wood, furn., other manuf.		4.55		40.99				6.14	18.22		3.37	23.96	2.77	100.00	(16)
(17) Paper, printing		7.85		25.53			5.69		31.54	7.23	6.15	11.30	4.62	100.00	(17)
(18) Rubber, plastics		11.13		10.40				2.92	45.07	10.22	8.58	5.11	6.57	100.00	(18)
(19) Construction		27.35		6.78					57.93	0.93		3.53	3.48	100.00	(19)
(20) Distribution		6.49	2.24	17.12	9.77	4.42	4.04	0.06	5.73	11.40	2.29	30.98	5.46	100.00	(20)
(21) Transport		6.70		33.68		2.11	1.53	0.74	26.95	6.16	5.14	12.98	4.01	100.00	(21)
(22) Communications				92.76								7.24		100.00	(22)
(23) Services		2.89	0.93	59.47	2.97	3.55	0.75	0.07	3.97	13.04	1.81	9.75	0.80	100.00	(23)
SECTORS	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total	SECTORS

TABLE 2 : IRELAND, 1990. INVESTMENT ALLOCATION MATRIX, K, AT 1970 PRICES. (FULL MATRIX HAS 23 ROWS, 35 COLUMNS)

PURCHASING SECTORS ↓ / PRODUCING SECTORS PERCENTAGES OF TOTAL →	(1) AGRIC. + FOREST	(16) METAL	(17) BUILD. MATS.	(18) CONSTRUC-TION	(20) TEXT. + CLOTH.	(22) WOOD + FURN.	(24) PLASTICS, RUBBER	(25) OTHER MANUF.	(26) NON-ELECT. MACH.	(27) OFFICE MACH. + PREC.	(28) ELECTR. MACH.	(29) MOTOR VEHS.	(30) OTHER TRANSP. EQUIP.	Total	Sectors
(1) Ag. + for. + fish.	8.15	8.92		26.30					29.69		3.06	20.84	3.04	100.00	(1)
(2) Meat + Milk		7.21		35.45		1.05			29.58		14.03	8.23	4.45	100.00	(2)
(3) Other food, drink, tob.		9.74		14.90					39.85	12.26	7.49	9.74	5.99	100.00	(3)
(4) Coal, Coke, peat		5.86		51.85					24.38	5.25	4.63	0.62	7.41	100.00	(4)
(5) Oils and gas		83.34		8.33									8.33	100.00	(5)
(6) Electr., townsgas, water		6.04		61.05					12.89	1.37	17.12	1.53		100.00	(6)
(7) Iron + steel		10.89		8.91					44.56		7.92	6.93	20.79	100.00	(7)
(8) Non-ferrous		7.74		28.17					30.66		5.88	12.69	14.86	100.00	(8)
(9) Building mats.		6.72		22.78					27.56		10.68	24.42	7.84	100.00	(9)
(10) Chemicals		11.50		7.47				3.05	47.24	10.31	8.85	4.53	7.05	100.00	(10)
(11) Metal goods		11.25		7.94				3.03	46.07	10.04	8.64	6.12	6.91	100.00	(11)
SECTORS	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	TOTAL	SECTORS
(12) Elec. and Non-electric machinery		10.16		16.96				3.07	41.85	9.10	7.81	4.80	6.25	100.00	(12)
(13) Vehic. + Other transp. equip.		3.94		54.08					16.34	3.38	2.82	12.96	6.48	100.00	(13)
(14) Textiles + clothing		8.80		21.61				3.25	36.52	8.03	6.88	9.56	5.35	100.00	(14)
(15) Leather + footwear		9.26		14.82					35.18	7.41	7.41	16.68	9.26	100.00	(15)
(16) Wood, furn., other manu.		4.62		40.12				6.65	18.67		3.51	23.66	2.77	100.00	(16)
(17) Paper + printing		7.91		24.50			5.58		32.71	7.13	6.05	11.16	4.96	100.00	(17)
(18) Rubber + plastics		11.05		9.98				3.03	45.46	9.98	8.56	4.99	6.95	100.00	(18)
(19) Construction		27.15		6.38					58.61	0.86		3.45	3.55	100.00	(19)
(20) Distribution		6.68	2.15	16.75	9.35	4.10	4.10	0.05	6.06	11.45	2.39	31.16	5.77	100.00	(20)
(21) Transport		6.81		32.60		1.38	1.55	0.84	27.89	6.07	5.24	12.86	4.18	100.00	(21)
(22) Communications				92.60								7.40		100.00	(22)
(23) Services		3.01	0.91	58.97	2.84	3.37	0.77	0.08	4.21	13.21	1.88	9.89	0.86	100.00	(23)
SECTORS	(1)	(16)	(17)	(18)	(20)	(22)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	TOTAL	SECTORS

Table 6 gives T 30 data for dwellings and scrap, including estimates for 1980 and 1985, as well as the 1974 final figures, all at 1970 prices. Appendix Two explains briefly how the projection of housebuilding was made for 1980 and 1985. The scrap element is of negligible importance.

TABLE 6: IRELAND, T 30, DWELLINGS AND SCRAP AT 1970 PRICES

EXPLOR sector of origin	For 1974	For 1980	For 1985
	£ million at 1970 prices		
(18) Dwellings	111.0	100.0	125.0
(35) Scrap	4.5	7.35	8.69

Table 7 sets out T 60 investment results and projections, for 1974, 1980 and 1985, all at 1970 prices. The 23 investing sectors of T 2 are used. Appendix Two describes briefly the methods of projection of GFCF aggregates. Table 7 column totals plus Table 6 Dwellings give Table A2.2 GFCF aggregates.

Table 8 gives T 35 results, which are changes in stocks at 1970 prices. We regard these as very unreliable for all three years shown.

Table 9 shows T 33, estimated government spending by commodity sectors, for the usual three years and at 1970 prices. Only three sectors of the full 35 EXPLOR sectors have their output purchased by government; these are 01. agriculture, etc. (mostly current expenditure on State forestry), 18. building (current repair and maintenance of roads etc. by local government authorities) and 35. services, which include almost all of government current expenditure on goods and services. The 1980 and 1985 patterns were obtained by scaling up the 1974 pattern so as to match the 1980 and 1985 totals estimated by the macro-procedure described in Appendix Two.

Table 10 shows T 36, exports at constant prices. Here also the aggregates were estimated by the macro-procedure described in Appendix Two. The patternisation was derived from actual export growth of each

EXPLOR sector between 1974 and 1978, by extrapolation to 1980 and 1985 and then doing overall scaling to fit the macro-aggregate. Further adjustment was required, in conjunction with imports, as will be described in comment on Table 11.

TABLE 7: IRELAND, T 60, INVESTMENT BY 23 SECTORS AT 1970 PRICES, for 1974, 1980 and 1985 (EXCLUDING DWELLINGS)

Sector	For 1974	For 1980	For 1985
		£ million at 1970 prices	
(1) Agriculture, forestry, fishing	51.167	78.7	85.8
(2) Meat and milk	15.215	25.6	29.4
(3) Other food; drink, tobacco	20.323	29.5	32.1
(4) Coal, coke, peat	1.591	2.5	2.4
(5) Oil and gas	0.045	0.1	0.1
(6) Electricity, towngas, water	24.358	34.3	38.0
(7) Iron and steel	1.301	0.7	0.8
(8) Non-ferrous metals	1.525	2.6	2.4
(9) Building materials	9.485	9.3	10.1
(10) Chemicals	11.233	27.9	28.1
(11) Metal goods	9.138	18.9	16.1
(12) Non-electric machinery	7.013	14.7	13.5
(13) Vehicles, other transport equipment	1.205	2.8	2.7
(14) Textiles and clothing	5.163	4.5	3.9
(15) Leather, footwear	0.593	0.5	0.4
(16) Wood, furniture, other manuf. n.e.s.	2.243	4.0	4.1
(17) Paper, printing	3.972	5.2	4.9
(18) Rubber, plastics	3.683	4.4	4.2
(19) Construction	12.276	13.8	15.7
(20) Distribution	28.533	14.6	15.8
(21) Transport	41.688	34.5	36.9
(22) Communications	19.116	21.4	21.9
(23) Services	78.399	110.5	128.7
Total	349.265	461.0	498.0

TABLE 8 : IRELAND, T 35, CHANGES IN STOCKS AT 1970 PRICES

EXPLOR Sector of origin	For 1974	For 1980	For 1985
	£ million at 1970 prices		
(1) agriculture etc.	-5.0	0.0	0.0
(2) meat	2.1	2.2	2.4
(3) milk	1.4	1.5	1.6
(4) other food	2.7	2.8	3.0
(5) drinks	0.6	0.6	0.7
(6) tobacco	4.0	4.2	4.5
(7) coal + peat	0.0	0.0	0.0
(9) crude petrol etc.	0.9	0.9	1.0
(14) ferrous	1.9	2.0	2.1
(15) non-ferrous	1.3	1.4	1.5
(16) metal prods.	2.3	2.4	2.6
(17) non-metall min.	2.7	2.8	3.0
(19) chemicals	5.0	5.0	5.6
(20) textiles	5.0	5.0	5.6
(21) leather	2.0	2.1	2.2
(22) wood + furn.	1.7	1.8	1.9
(23) paper + print.	4.1	5.0	4.6
(24) rubber + plastics	3.5	3.7	3.9
(25) other manuf.	0.6	0.6	0.7
(26) ag. + indus. mach.	2.7	2.8	3.0
(27) office + data pro.	0.7	0.7	0.8
(28) elect. goods	2.1	2.2	2.4
(29) motor veh.	5.4	5.5	6.0
(30) other transp. equip.	0.8	0.8	0.9
(34) Wholesale + retail	0.0	0.0	0.0
(35) Other services	0.0	0.0	0.0
Total	48.5	56.0	60.0

Footnote: Method. The macro-projections give £56m. for 1980 and £60m. for 1985.
Take zero for Ag. etc. and scale up 1974 pattern for rest of 1974 items.

TABLE 9: IRELAND, T 33, GOVERNMENT SPENDING BY COMMODITY SECTORS AT 1970 PRICES

EXPLOR Sector of origin	For 1974	For 1980	For 1985
	£ million at 1970 prices		
01. agriculture etc.	0.489	0.6	0.6
(12. radio-active) ≠	(0.01)	(0.01)	(0.01)
18. building	19.249	22.5	21.9
35. services	300.362	350.9	342.5
Total	320.100	374.0	365.0

≠ For computing purposes row 12, requires a dummy small entry, to permit non-zero sector 12, output,

TABLE 10: IRELAND T 36, EXPORTS AT 1970 PRICES

EXPLOR Sector of origin	For 1974	For 1980	For 1985
	£ million at 1970 prices		
01. Ag. etc.	69.88	94.6	128.5
02. meat	105.85	186.1	252.9
03. Dairy	22.30	50.0	67.9
04. Other food	62.26	125.5	170.5
05. Drinks	11.20	14.0	19.0
06. Tobacco	8.31	29.7	40.4
07. Coal + peat	1.73	2.0	2.7
08. Coke	0.15	0.2	0.2
09. Petrol	2.52	3.0	4.1
14. Ferrous metals	5.84	12.3	16.7
15. Non-ferrous metals	18.65	25.8	35.0
16. Metal prods.	28.74	55.0	74.7
17. Build. mats.	19.72	15.2	20.6
19. Chemicals	66.19	174.2	236.7
20. Text. + cloth.	95.90	154.1	209.9
21. Leather + footwear	13.98	4.9	6.6
22. Wood + furn.	3.32	4.3	5.9
23. Paper + print	18.06	50.8	69.1
24. Plastics + rubber	16.73	4.3	5.9
25. Other manuf.	7.40	10.2	13.8
26. Ag. + ind. mach.	20.92	49.8	67.7
27. Office etc. mach,	16.01	52.5	71.4
28. Electrical	48.54	55.9	75.9
29. Motor vehicles	4.00	12.3	16.7
31. Inland transport	2.13	3.0	4.1
32. Mar. +auxiliary	48.19	67.5	91.7
33. Communication	0.87	1.8	2.4
35. Services	13.41	14.0	19.0
Total	732.80	1273.0	1730.0

TABLE 11: IRELAND, T37, IMPORTS AT 1970 PRICES

EXPLOR sector of origin	For 1974	For 1980	For 1985
	£ million at 1970 prices		
01. Ag. for., fish	-137.46	187.6	-279.8
02. Meat etc.	- 2.42	-2.9	-3.9
03. Dairy	- 1.55	-2.1	-2.8
04. Other food	-39.93	-51.5	-68.6
05. Drinks	- 6.13	-9.2	-12,3
06. Tobacco	- 2.20	-4.2	-5.6
07. Coal	- 7.24	-7.0	-9.3
08. Coke	- 0.16	-0.2	-0.3
09. Petrol	-50.61	-72.4	-96.5
14. Ferrous	-37.53	-63.4	-84.4
15. Non-ferrous	-14.96	-20.6	-27.5
16. Metal prods.	-54.81	-78.9	-95.1
17. Build. mats.	-16.25	-16.9	-22.5
19. Chemicals	-100.73	-110.5	-147.2
20. Textiles and cl.	-112.34	-184.4	-245.7
21. Leath. and footw.	-21.36	-27.4	-31.5
22. Wood and furn.	-19.61	-38.6	-51.4
23. Paper and print.	-37.66	-86.9	-115.8
24. Plastics and rubber	-30.33	-36.0	-47.9
25. Other manu.	-29.27	-49.8	-61.4
26. Ag. and ind. mach.	-105.36	-128.5	-171.2
27. Office etc. mach.	-29.97	-48.0	-58.9
28. Electr. goods	-60.52	-63.4	-79.5
29. Motor vehics.	-56.25	-93.5	-124.5
30. Other transp. equip.	- 6.72	-2.0	-2.6
32. Mar./air/aux.	-16.72	-13.9	-18.5
33. Communic.	- 1.61	-2.0	-2.7
35. Services	- 1.31	-1.2	-1.6
TOTAL	-990.97	-1403.0	-1869.0

Table 11 shows T37, imports at constant prices. Appendix Two describes the macro-procedure to estimate the 1980 and 1985 aggregates. The patternisation of these aggregates was done in the same way as for exports. But further adjustment of imports and matching (same sector) exports was required so as to give two results:

(i) each sector total output was positive, necessary to give sensible results for 1980 and 1985.

(ii) each sector export was less than the sector total output. This again is a sensible result, although to change exports and negative imports by the same amount (in a row), will not affect the sector total output.

Appendix 8 shows computed sector outputs and matched pre-specified exports, for 1980 and 1985.

Table 12 gives T3, the direct technical coefficients' matrix, for 1974 at 1970 prices. The RAS scaling method was used, to update an Irish 1969 table so as to fit inter-industry aggregates for 1974, at 1970 prices. The 1969 transactions table was the 35 - sector outcome of an R44 Irish table prepared by the Central Statistics Office for EUROSTAT. Sector 08 coke includes only coke which is a byproduct of 11. townsgas. Sector 12. radio-active materials, is non existent in Ireland.

Table 13 gives T3 for 1980, at 1970 prices. These 1980 coefficients are tentative. The RAS multipliers r_i and s_j, derived from the changes between 1969 and 1974, were modified where they looked excessive, before applying them to the 1974 A-matrix in order to estimate the 1980 matrix. Appendix Two table A2.3 shows the r_i and s_j multipliers actually used, in estimating T3 for 1980.

Table 14 gives T3 for 1985, at 1970 prices. The same (modified) RAS multipliers were applied to the 1980 A-matrix, in order to estimate Table 14. It is clear that these 1985 coeffients are tentative.

TABLE 12: IRELAND T3, 1974 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols 1 - 15)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)
(1)	.14447	.78734	.85609	.31008	.02034	.14737						(1)				
(2)		.01702		.00385								(2)				
(3)	.01774		.00175	.03706								(3)				
(4)	.06825	.00257	.00774	.19713	.00423				.00147			(4)				
(5)				.00400	.02983							(5)				
(6)												(6)				
(7)		.00004	.00138	.00141	.00058	.00001	.00059			.10626	.03535	(7)			.00009	.00006
(8)												(8)				
(9)	.01774	.00532	.01248	.01101	.00229	.00110	.00555		.20336	.06139	.09773	(9)			.00780	.00900
(10)	.00532	.00448	.01542	.01069	.00184	.00075	.01553		.00219		.00339	(10)		.01998	.01752	.02010
(11)		.00092	.00113	.00079	.00006	.00002					.05822	(11)				
(12)												(12)				
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	CODES	(12)	(13)	(14)	(15)
(13)		.00139		.00125	.00088							(13)				
(14)	.00632	.00021	.00029	.00030	.00006	.00007			.00003	.00108	.00019	(14)		.07803	.19889	.22876
(15)	.00318	.00011	.00015	.00015	.00003	.00003			.00001	.00032	.02654	(15)		.05856	.10012	.11508
(16)	.00052	.00377	.00372	.01384	.00079	.00234	.00006		.00015			(16)		.00998	.00297	.00340
(17)	.00730	.00171	.02195	.00797	.00419	.00007	.00021		.00034			(17)			.00100	.00111
(18)	.00001	.00005	.00006	.00007	.00002	.00003				.00002		(18)			.01690	.01947
(19)	.04574	.00009	.00016	.00355	.00086	.00031	.00029		.00033			(19)		.07068	.02066	.02382
(20)	.00130	.00051		.00126								(20)				
(21)												(21)				
(22)		.00014	.00028	.00031	.00008	.00047	.00043			.00010		(22)			.00092	.00111
(23)	.00004	.00813	.01581	.02891	.00194	.00066	.00262		.00090	.00113		(23)			.00968	.01114
(24)	.00009	.00272	.00353	.01107	.00029	.00174	.00007		.00008	.00020		(24)		.04071	.00160	.00177
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	CODES	(12)	(13)	(14)	(15)
(25)		.00012	.00016	.00023	.00004	.00007			.00001	.00004		(25)			.00087	.00095
(26)	.00685	.00634	.00955	.00929	.00200	.00211	.00176		.00100	.00047		(26)		.02365	.02040	.02348
(27)		.00020	.00015	.00021	.00003	.00005			.00002			(27)			.00023	.00024
(28)	.00004	.00014	.00021	.00017	.00005	.00004			.00002	.03047		(28)		.03701	.00054	.00059
(29)	.00015											(29)				
(30)	.00023											(30)				
(31)	.01509	.00235	.00301	.00418	.00082	.00117	.00850		.00014	.00086		(31)			.00599	.00680
(32)		.00374	.00454	.00563	.00129	.00202	.01406		.00027	.00116		(32)			.01104	.01269
(33)	.00044	.00589	.01129	.01247	.00234	.00416	.03608		.00057	.00274	.00217	(33)		.00428	.02450	.02805
(34)	.03690	.00442	.00858	.02979	.00136	.00211	.03565		.00227	.02794		(34)			.01202	.01456
(35)	.03496	.04882	.04038	.04110	.00846	.00978	.06251		.00150	.00406	.01362	(35)		.03568	.09999	.11511
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)

TABLE 12: IRELAND, T3.1974 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols 16 - 35)

	(16)	(17)	(18)	(19)	(20)	(21)	ROW CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	ROW CODES
(1)		.00020		.01084	.03425		(1)	.03680	.00237	.00211						.00009					.00103	(1)
(2)				.00212		.06373	(2)	.00318			.00017										.00069	(2)
(3)							(3)			.00099											.00036	(3)
(4)		.00013		.00670	.00041	.00083	(4)											.00409			.00034	(4)
(5)							(5)														.00002	(5)
(6)							(6)														.00005	(6)
(7)	.00042	.00062	.00027	.00027	.00015	.00009	(7)	.00009	.00096	.00064		.00009			.00005		.00317	.00174		.00357	.00030	(7)
(8)		.00003					(8)															(8)
(9)	.00996	.00984	.01462	.02150	.00887	.00578	(9)	.01981	.00844	.00927	.01950	.01458	.00494	.00805	.00258	.00322	.04854	.04292	.00222	.02025	.00273	(9)
(10)	.00728	.02507	.00529	.01861	.01140	.00574	(10)	.01455	.01303	.02053	.00704	.01411	.00471	.01179	.00386	.00803		.00442	.00270	.00722	.00245	(10)
(11)	.00238	.00143	.00005		.00043		(11)	.00083	.00057	.00153										.00017	.00012	(11)
(12)							(12)															(12)
COLUMN CODES	(16)	(17)	(18)	(19)	(20)	(21)	CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(13)							(13)		.00148	.00462											.00002	(13)
(14)	.19608	.01692	.01572	.00092	.00040	.00011	(14)	.00362	.00192	.00094	.01616	.18088	.01220	.10376	.00327	.03776		.00077	.00006		.00062	(14)
(15)	.09864	.00851	.00791	.00045	.00019	.00006	(15)	.00181	.00096	.00044	.00821	.09094	.00611	.05218	.00166	.01895		.00039	.00002		.00031	(15)
(16)	.03714	.00473	.04606	.01010	.00268	.01350	(16)	.01887	.00420	.00447	.06606	.03426	.00547	.02053	.00615	.00728	.00683	.00208	.00025	.00669	.00244	(16)
(17)	.01017	.14930	.18544	.18917	.00344	.00106	(17)	.00508	.00070	.00163	.00411	.00092	.00023	.00303	.00827	.00022			.00006	.00174	.00144	(17)
(18)	.00005	.00007	.06550	.00009	.00009	.00007	(18)	.00010	.00007	.00004	.00010	.00007	.00014	.00009	.00005	.00005	.03720	.00510	.00733	.00007	.00324	(18)
(19)	.00710	.01173	.00568	.29776	.08053	.01354	(19)	.01924	.01343	.22101	.01369	.00672	.00685	.00859	.00377	.00301	.00102	.00048	.00003	.00077	.00445	(19)
(20)	.00037	.00060	.00366	.00021	.24249	.01288	(20)	.02300	.00396	.00465	.00421		.00028	.00012	.00082	.00258		.00004	.00190	.00186	.00032	(20)
(21)					.01604	.29548	(21)	.00130	.00463	.00919	.00267		.00111								.00001	(21)
(22)	.00548	.00124	.05243	.00150	.00055	.00039	(22)	.19660	.00084	.00034	.05705	.00277	.00058	.00524	.00188	.00671		.00003			.00019	(22)
(23)	.00638	.01431	.00653	.03613	.01453	.01653	(23)	.01071	.26225	.01507	.02208	.00929	.01923	.01162	.00352	.00284	.00038	.00503	.00650	.01604	.00635	(23)
(24)	.00362	.01035	.00493	.01335	.00569	.02589	(24)	.01529	.00653	.10997	.01427	.01122	.01357	.02480	.02035	.00287		.00001	.00010	.00189	.00357	(24)
COLUMN CODES	(16)	(17)	(18)	(19)	(20)	(21)	CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(25)	.00090	.18099	.00007	.00029	.00028	.00016	(25)	.00038	.00057	.00023	.12414	.00018	.00037	.00029	.00016	.00012	.00005	.00008	.00003	.00016	.00002	(25)
(26)	.00703	.06279	.00442	.01133	.00931	.00367	(26)	.00518	.01547	.01668	.00459	.19484	.00599	.00585	.00068	.09003		.00501	.00070		.00018	(26)
(27)	.00190	.00083	.00015	.00014	.00028	.00009	(27)	.00019	.00011	.00025	.00019	.00013	.31604	.00008	.00002		.00350	.00121	.00003	.00284	.00092	(27)
(28)	.00042	.00046	.02337	.00036	.00023	.00008	(28)	.00017	.00025	.00093	.00165	.00451	.00954	.18894	.00218	.00411	.00143	.00095	.00003	.00124	.00111	(28)
(29)	.00037						(29)								.49530		.07041				.00468	(29)
(30)							(30)									.13101	.05783	.07466			.00033	(30)
(31)	.00286	.00752	.03087	.00484	.00502	.00314	(31)	.00544	.00317	.00213	.00307	.00416	.00730	.00508	.00284	.00238		.00014	.01995	.02289	.00375	(31)
(32)	.00497	.00291	.00196	.00897	.00870	.00517	(32)	.00810	.00559	.00417	.00564	.00795	.01099	.00883	.00455	.00358	.00048	.17842	.01963	.01011	.00088	(32)
(33)	.01013	.00685	.00456	.01769	.01770	.01061	(33)	.01837	.01195	.00933	.01121	.01442	.02373	.01714	.00942	.00737	.00195	.01939	.03622	.01972	.00789	(33)
(34)	.00712	.00503	.04570	.00971	.01006	.02070	(34)	.01102	.00747	.00581	.00600	.00847	.01228	.00954	.00525	.00486	.00734	.00944	.00647	.01011	.00373	(34)
(35)	.03018	.01161	.04270	.04980	.06898	.04072	(35)	.08154	.04183	.02829	.03478	.03752	.06121	.04212	.03161	.02510	.07074	.09884	.03210	.08357	.04789	(35)
COLUMN CODES	(16)	(17)	(18)	(19)	(20)	(21)	ROW CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	ROW CODES

TABLE 13: IRELAND, T3 1980 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols. 1 - 21)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	ROW CODES
(1)	.14882	.78784	.82185	.35600	.01675	.14737						(1)						.00019		.01138	.03357		(1)
(2)		.01586		.01010								(2)								.00200		.04589	(2)
(3)	.01645		.00152	.04043								(3)											(3)
(4)	.05624	.00206	.00594	.18136	.00270				.00100			(4)						.00010		.00500	.00032	.00053	(4)
(5)				.00500	.02625							(5)											(5)
(6)												(6)											(6)
(7)		.00003	.00106	.00130	.00037	.00001	.00049			.08591	.02404	(7)			.00006	.00004	.00030	.00044	.00020	.00022	.00012	.00006	(7)
(8)												(8)						.00003					(8)
(9)	.01827	.00530	.01193	.01266	.00183	.00110	.00582		.18300	.00134	.08307	(9)			.00700	.00810	.00806	.02685	.01388	.02057	.00870	.00463	(9)
(10)	.00739	.00604	.01998	.01660	.00198	.00101	.02201		.00266		.00394	(10)		.00038	.02137	.02449	.00884	.03343	.00679	.02638	.01509	.00620	(10)
(11)		.00124	.00146	.00123	.00006	.00003					.06681	(11)					.00283	.00183	.00006		.00056		(11)
(12)												(12)											(12)
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	CODES
(13)		.00139		.00143	.00071							(13)											(13)
(14)	.00846	.00027	.00037	.00045	.00006	.00009			.00004	.00141	.00651	(14)		.10144	.23271	.26765	.22942	.02030	.01042	.00125	.00051	.00012	(14)
(15)	.00398	.00013	.00017	.00020	.00003	.00004			.00001	.00038	.00707	(15)		.07027	.10813	.12429	.10653	.00970	.00902	.00057	.00023	.00005	(15)
(16)	.00051	.00358	.00339	.01512	.00060	.00222	.00006		.00013			(16)		.00948	.00254	.00291	.03176	.00427	.04157	.01008	.00249	.01026	(16)
(17)	.00978	.00222	.02749	.01192	.00436	.00092	.00023		.00040			(17)			.00110	.00130	.01190	.18433	.23025	.25821	.00438	.00110	(17)
(18)	.00001	.00004	.00005	.00008	.00001	.00003				.00002		(18)			.01445	.01665	.00004	.00007	.05911	.00009	.00009	.00005	(18)
(19)	.04240	.00008	.00014	.00988	.00062	.00028	.00027		.00270			(19)		.06361	.01674	.01330	.00575	.01003	.00486	.28138	.07103	.00975	(19)
(20)	.00108	.00041		.00116								(20)					.00026	.00040	.00278	.00018	.19011	.00824	(20)
(21)												(21)									.02043	.30730	(21)
(22)		.00013	.00024	.00032	.00006	.00043	.00041			.00007		(22)			.00074	.00090	.00444	.00106	.04482	.00142	.00049	.00028	(22)
(23)	.00004	.00813	.01517	.03325	.00155	.03066	.00275		.00081	.00113		(23)			.00872	.01003	.00575	.01359	.00550	.03794	.01424	.01323	(23)
(24)	.00010	.00285	.00356	.01336	.00024	.00180	.00008		.00007	.00021		(24)		.04275	.00151	.00167	.00343	.01033	.00492	.01472	.00585	.02175	(24)
COLUMN CODES												CODES											CODES
(25)		.00011	.00014	.00024	.00003	.00007			.00001	.00004		(25)			.00070	.00077	.00073	.15475	.00006	.00027	.00025	.00011	(25)
(26)	.00691	.00622	.00898	.01047	.00157	.00206	.00181		.00089	.00046		(26)		.02318	.01799	.02071	.00620	.05846	.00411	.01166	.00895	.00288	(26)
(27)		.00026	.00019	.00032	.00003	.00007			.00002			(27)			.00027	.00028	.00222	.00103	.00019	.00020	.00036	.00009	(27)
(28)	.00003	.00011	.00016	.00015	.00003	.00003			.00001	.00137		(28)		.02961	.00039	.00043	.00031	.00035	.01776	.00030	.00018	.00005	(28)
(29)	.00018											(29)					.00040						(29)
(30)	.00024											(30)											(30)
(31)	.02021	.00305	.00375	.00826	.00085	.00152	.05256		.00016	.00110		(31)			.00701	.00795	.00335	.00931	.03813	.00661	.00639	.00327	(31)
(32)		.00442	.00523	.00778	.00124	.00242	.01772		.00030	.00139		(32)			.01193	.01371	.00537	.00332	.00224	.01131	.01023	.00497	(32)
(33)	.00059	.00766	.01409	.01864	.00309	.00541	.04925		.00066	.00357	.00240	(33)		.00554	.02867	.03282	.01185	.00846	.00563	.02415	.02255	.01104	(33)
(34)	.03610	.00420	.00782	.03255	.00149	.00201	.03556		.00194	.02054		(34)			.01079	.01245	.00609	.00453	.03944	.00969	.00336	.01573	(34)
(35)	.04502	.06102	.04846	.05908	.00846	.01222	.08207		.00113	.50502	.01458	(35)		.04460	.11249	.12950	.03135	.01379	.05071	.06537	.08449	.04072	(35)
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	CODES

TABLE 13: IRELAND, T3 1980 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols. 21-35)

	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	ROW CODES
(1)	.03716	.00213	.00222						.00008					.00082	(1)
(2)	.00289			.00015										.00050	(2)
(3)			.00088											.00026	(3)
(4)											.00360			.00022	(4)
(5)														.00001	(5)
(6)														.00004	(6)
(7)	.00007	.00069	.00054		.00008			.00003		.00228	.00125		.00228	.00057	(7)
(8)															(8)
(9)	.02001	.00759	.00874	.01950	.01518	.00395	.00829	.00206	.00258	.04369	.03863	.00173	.01620	.00299	(9)
(10)	.01984	.01584	.02910	.00950	.01943	.00514	.01640	.00417	.00867		.00537	.00291	.00780	.00264	(10)
(11)	.00113	.00069	.00216										.00018	.00013	(11)
(12)															(12)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(13)		.00133	.00485											.00002	(13)
(14)	.00475	.00225	.00129	.02100	.23984	.01269	.13893	.00340	.03227		.00090	.00006		.00065	(14)
(15)	.00219	.00103	.00055	.00985	.11131	.00586	.06449	.00159	.01819		.00043	.00002		.00030	(15)
(16)	.01810	.00367	.00445	.06276	.03320	.00416	.02038	.00468	.00553	.00584	.00230	.00019	.00503	.00185	(16)
(17)	.00667	.00082	.00222	.00534	.00029	.00024	.00414	.00880	.00023			.00006	.00181	.00150	(17)
(18)	.00009	.00006	.00004	.00010	.00006	.00011	.00009	.00004	.00003	.03180	.00436	.05117	.00005	.00246	(18)
(19)	.01749	.01574	.20885	.01250	.00617	.00493	.00796	.00271	.00217	.00083	.00039	.00002	.00056	.00321	(19)
(20)	.01876	.00264	.03398	.00837		.00018	.00010	.00436	.00168		.00003	.00122	.00119	.00021	(20)
(21)	.00171	.00541	.01255	.00347		.00115								.00001	(21)
(22)	.17871	.00068	.00082	.05215	.00255	.00042	.00485	.00135	.00483		.00007			.00014	(22)
(23)	.01082	.23603	.01582	.02208	.00947	.01533	.01197	.00281	.00227	.00035	.00453	.00520	.01283	.00508	(23)
(24)	.01622	.00617	.12124	.01498	.01201	.01140	.02682	.01710	.00241		.00001	.00008	.00159	.00300	(24)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(25)	.00035	.00046	.00022	.11172	.00016	.00027	.00026	.00011	.00009	.00004	.00007	.00002	.00012	.00001	(25)
(26)	.00513	.01364	.01717	.00450	.19476	.00469	.00591	.00054	.07058		.00442	.00055		.00014	(26)
(27)	.00025	.00012	.00034	.00025	.00017	.32868	.00011	.00003		.00409	.00142	.00003	.00295	.00096	(27)
(28)	.00013	.00018	.00078	.00132	.00388	.00610	.15569	.00139	.00263	.00103	.00068	.00002	.00079	.00071	(28)
(29)								.47549		.07605				.00450	(29)
(30)									.11005	.05465	.07055			.00028	(30)
(31)	.00715	.00370	.00291	.00399	.00552	.00759	.00680	.00296	.00248		.00017	.02075	.02380	.00390	(31)
(32)	.00982	.00603	.00526	.00677	.00969	.01055	.01092	.00436	.00344	.00052	.19270	.01885	.00971	.00085	(32)
(33)	.02490	.01398	.01274	.01457	.01912	.02468	.02295	.00980	.00766	.00228	.02269	.03766	.02051	.00821	(33)
(34)	.01115	.00639	.00585	.00573	.00820	.00934	.00934	.00407	.00370	.00679	.00294	.00036	.00769	.00283	(34)
(35)	.10294	.04706	.03713	.04348	.04787	.06121	.05403	.03161	.02513	.07358	.11120	.01310	.08357	.04785	(35)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES

TABLE 14. IRELAND, T3, 1985 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols. 1 - 21)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	ROW CODES
(1)	.15327	.78784	.78898	.41008	.01340	.14737						(1)						.00018		.01195	.03230		(1)
(2)		.01427		.01055								(2)								.00189		.03304	(2)
(3)	.01524		.00131	.04185								(3)											(3)
(4)	.04634	.00165	.00456	.16685	.00173				.00076			(4)						.00007		.00472	.00025	.00034	(4)
(5)				.00640	.02310							(5)											(5)
(6)												(6)											(6)
(7)		.00003	.00081	.00120	.00024	.00001	.00041			.06900	.01035	(7)			.00004	.00003	.00022	.00033	.00015	.00019	.00009	.00004	(7)
(8)												(8)						.00003					(8)
(9)	.01882	.00530	.01150	.01456	.00146	.00110	.00612		.16470	.06193	.07061	(9)			.00632	.00729	.00807	.02093	.01319	.02370	.00852	.00370	(9)
(10)	.01028	.00816	.02590	.02577	.00214	.00137	.03120		.00323		.00447	(10)		.03642	.02596	.02967	.01074	.04287	.00871	.03739	.01096	.00670	(10)
(11)		.00167	.00189	.00191	.00007	.00004					.07667	(11)					.00351	.00235	.00007		.00075		(11)
(12)												(12)											(12)
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	CODES
(13)		.00139		.00165	.00057							(13)											(13)
(14)	.01133	.00035	.00046	.00068	.00006	.00012			.00005	.00183	.07349	(14)		.13187	.27220	.31315	.26842	.02581	.02398	.00171	.00065	.00012	(14)
(15)	.00486	.00015	.00020	.00028	.00003	.00005			.00002	.00046	.02761	(15)		.08433	.11678	.13423	.11505	.01106	.01028	.00072	.00027	.00005	(15)
(16)	.00050	.00340	.00309	.01652	.00046	.00211	.00006		.00011			(16)		.00901	.00217	.00249	.00215	.00385	.03751	.01005	.00232	.00780	(16)
(17)	.01310	.00289	.03419	.01782	.00453	.00011	.00039		.00047			(17)			.00136	.00153	.01392	.22772	.28436	.35246	.00558	.00114	(17)
(18)	.00001	.00004	.00005	.00008	.00001	.00002				.00002		(18)			.01236	.01423	.00004	.00006	.05335	.00009	.00008	.00004	(18)
(19)	.03931	.00008	.00012	.01023	.00045	.00025	.00026		.00218			(19)		.05725	.01356	.01563	.00466	.00857	.00415	.26590	.00265	.00702	(19)
(20)	.00089	.00033		.00107								(20)					.00019	.00035	.00211	.00015	.14905	.00327	(20)
(21)												(21)									.02603	.31959	(21)
(22)		.00011	.00021	.00034	.00004	.00038	.00038		.00008			(22)			.00060	.00073	.00360	.00091	.03833	.00134	.00043	.00020	(22)
(23)	.00004	.00813	.01457	.03823	.00124	.03066	.00289		.00073	.00113		(23)			.00784	.00903	.00517	.01291	.00589	.03383	.01395	.01059	(23)
(24)	.00011	.00300	.00359	.01613	.00020	.00191	.00009		.00007	.00022		(24)		.04488	.00143	.00158	.00324	.01030	.00491	.01623	.00602	.01827	(24)
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	CODES
(25)		.00010	.00012	.00025	.00002	.00006			.00001	.00003		(25)			.00057	.00062	.00059	.13231	.00005	.00026	.00022	.00008	(25)
(26)	.00698	.00609	.00845	.01181	.00123	.00202	.00187		.00078	.00045		(26)		.00271	.01587	.01827	.00547	.05442	.00383	.01200	.00859	.00226	(26)
(27)		.00034	.00023	.00047	.00004	.00009			.00003			(27)			.00032	.00033	.00200	.00127	.00023	.00027	.00045	.00009	(27)
(28)	.00003	.00009	.00012	.00014	.00002	.00003			.00001	.01950		(28)		.02368	.00028	.00031	.00022	.00026	.01350	.00025	.00014	.00003	(28)
(29)	.00023											(29)					.00043						(29)
(30)	.00026											(30)											(30)
(31)	.02706	.00397	.00468	.00935	.00088	.00197	.07174		.00019	.00146		(31)			.00821	.00930	.00392	.01150	.04709	.00902	.00814	.00340	(31)
(32)		.00539	.00603	.01073	.00119	.00290	.02232		.00032	.00167		(32)			.01288	.01481	.00580	.00378	.00255	.01425	.01203	.00477	(32)
(33)	.00079	.00996	.01758	.02787	.00321	.00704	.06723		.00078	.00463	.00205	(33)		.00720	.03354	.03839	.01386	.01045	.00695	.03296	.02873	.01148	(33)
(34)	.03533	.00299	.00719	.03556	.00113	.00191	.03547		.00166	.00521		(34)			.00922	.01064	.00521	.00409	.03560	.00966	.00872	.01196	(34)
(35)	.05726	.07627	.05815	.08493	.00846	.01528	.10760		.00190	.00695	.01588	(35)		.05575	.12655	.14562	.03820	.01637	.06022	.08579	.10351	.04072	(35)
COLUMN CODES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	ROW CODES	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	CODES

TABLE 14. IRELAND, T3, 1985 DIRECT TECHNICAL COEFFICIENTS AT 1970 PRICES (Cols. 22 - 35)

	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	ROW CODES
(1)	.03754	.00192	.00233						.00006					.00066	(1)
(2)	.00263			.00014										.00036	(2)
(3)			.00083											.00019	(3)
(4)											.00259			.00014	(4)
(5)														.00001	(5)
(6)														.00003	(6)
(7)	.00006	.00050	.00045		.00006			.00902		.00164	.00090		.00146	.00037	(7)
(8)															(8)
(9)	.00021	.00686	.01022	.01950	.01548	.00316	.00854	.00165	.00206	.03932	.03476	.00142	.01096	.00239	(9)
(10)	.02705	.01924	.04125	.01283	.02676	.00555	.02280	.00451	.00936		.00652	.00315	.00843	.00285	(10)
(11)	.00155	.00083	.00306										.00019	.00015	(11)
(12)															(12)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(13)		.00120	.00509											.00001	(13)
(14)	.00024	.00263	.00176	.02730	.31803	.01320	.18602	.00354	.04084		.00105	.00006		.00067	(14)
(15)	.00266	.00111	.00069	.01182	.13624	.00563	.07372	.00153	.01746		.00046	.00002		.00029	(15)
(16)	.01737	.00314	.00444	.05962	.02217	.00316	.01994	.00355	.00420	.00409	.00196	.00015	.00387	.00141	(16)
(17)	.00876	.00096	.00303	.00694	.00038	.00025	.00554	.00895	.00024			.00006	.00189	.00156	(17)
(18)	.00009	.00005	.00004	.00009	.00006	.00008	.00008	.00003	.00003	.02719	.00373	.03882	.00004	.00187	(18)
(19)	.01590	.01275	.19737	.01125	.00566	.00355	.00738	.00195	.00156	.00067	.00031	.00002	.00040	.00231	(19)
(20)	.01516	.00190	.02854	.00270		.00011	.00008	.00279	.00106		.00002	.00078	.00076	.00013	(20)
(21)	.00225	.00633	.01713	.00451		.00120								.00001	(21)
(22)	.16245	.00055	.00084	.04694	.00234	.00030	.00449	.00097	.00348		.00006			.00010	(22)
(23)	.01093	.21243	.01661	.02208	.00966	.01231	.01233	.00225	.00182	.00031	.00408	.00416	.01026	.00406	(23)
(24)	.01720	.00583	.13367	.01573	.01287	.00957	.02900	.01436	.00202		.00001	.00007	.00133	.00052	(24)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES
(25)	.00031	.00037	.00021	.10055	.00015	.00019	.00024	.00008	.00006	.00003	.00006	.00002	.00008	.00001	(25)
(26)	.00508	.01203	.01767	.00441	.19468	.00368	.00596	.00042	.05534		.00390	.00043		.00011	(26)
(27)	.00032	.00014	.00046	.00032	.00022	.34183	.00015	.00003		.00479	.00166	.00004	.00307	.00100	(27)
(28)	.00011	.00013	.00065	.00105	.00300	.00391	.12829	.00089	.00168	.00074	.00049	.00001	.00051	.00045	(28)
(29)								.45647		.08213				.00432	(29)
(30)									.02244	.05164	.06667			.00024	(30)
(31)	.00938	.00433	.00397	.00519	.00731	.00790	.00910	.00307	.00258		.00019	.00259	.00476	.00406	(31)
(32)	.01190	.00652	.00662	.00812	.01186	.01012	.01350	.00419	.00330	.00056	.29811	.01509	.00290	.00081	(32)
(33)	.03270	.01636	.01739	.01824	.02535	.02566	.03073	.01019	.00737	.00267	.02655	.03917	.02133	.00854	(33)
(34)	.01070	.00546	.00583	.00544	.00795	.00719	.00913	.00309	.00281	.00581	.00251	.00027	.00584	.00215	(34)
(35)	.12996	.05294	.04873	.05435	.06104	.06121	.06982	.03161	.02510	.08958	.12510	.01910	.03457	.04782	(35)
COLUMN CODES	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	CODES

BLOCK III: COMMODITY PRICES - MINIMISATION (11 data-sets)

The following scheme sets out the 11 new data-sets required for the Commodity Prices - Minimisation block.

Table Number	Dimension Rows x cols	Unit	Symbol	Definition
T 69	1 x n	%	z^*	Negative product transfer coefficients; negative transfer over domestic production at constant prices, negative signs, percentages
T 5	n x n	%	Z	Product transfer matrix. Sum of row = 0, elements in diagonal = 100 and outside are all negative
T 42	1 x n	%	Π_1	Ad valorem (turnover) indirect tax rates, applied to current domestic production, presented in percentages
T 43	1 x n	%	Π_2	Specific volumetric tax rates. Indirect taxes applied to the constant price domestic production, presented in percentages
T 45	1 x n	%	ϵ	Ad valorem (turnover) subsidy rates, in percentage form, on domestic production at current prices
T 72	1 x n	ratio	ℓ^*	Labour/output coefficient. Labour used per domestic production at constant prices, in persons per million monetary units
T 49	1 x n	unit	ω	Average annual wage rates, at current prices, per employee
T 87	1 x n	index	p^*	Nominal price index numbers (start up). Estimated price indices for domestic production
T 94	1 x n	%	σ^*	Gross profit margins (start up). Estimated gross profit margins over domestic production (presented as percentages)
T 90	1 x n	unit	α_p	Weights on prices, for the minimisation procedure
T 91	1 x n	unit	α_σ	Weights on profit, for the minimisation procedure

The T 69 vector is shown below as Table 15, which has only 6 non-zero elements. It is derived from 1969 data, as detailed in Appendix Three. The Table 15 entries are proposed for 1974, 1980 and 1985, unless better data become available.

TABLE 15: IRELAND, T 69, NEGATIVE PRODUCT TRANSFER COEFFICIENTS

EXPLOR producing sector	z* coefficients: negative percentages
01. Agriculture etc.	-6.268
04. Other food	-0.010
05. Drinks	-0.925
11. Gas	-9.957
21. Leather and footwear	-2.944
24. Rubber and plastics	-5.342

The T 5 product transfer matrix appears as Table Only non-zero entries are accounted for; thus we have 6 rows and 10 columns. Here again the data used are from the CSO 1969 input-output R 44 transactions and are shown in Appendix Three; individual entries can be identified from the notes on T 69, also in that appendix. It is necessary use Table 16 data for 1980 and 1985, as well as for 1974, until newer data become available.

TABLE 16: IRELAND, T 5, PRODUCT TRANSFER MATRIX

EXPLOR sector row	01. Ag. etc.	02. Meat	03. Dairy	04. Other Food	05. Drinks	08. Coke	11. Towngas	19. Chemicals	21. Leather + footw.	24. Rubber etc.
01. Ag.	100.000	-0.382	-99.618							
04. Oth. food				100.000				-100.000		
05. Drinks				-95.173	100.000			-4.827		
11. Gas						-75.214	100.000	-24.786		
21. Leather	-100.000								100.000	
24. Rubber									-100.000	100.000

Table 17 gives percentages for indirect taxes and for subsidies, for the year 1974. These percentages are derived from 1974 value estimates, at 1970 prices, shown in Table A7.1 and used to make the borders (primary input) of the A - matrix for 1974, so that RAS procedures could be applied to get an estimated 1974 A - matrix. The distribution of the indirect taxes and subsidies, as rows of values, fit the 1974 National Accounts control totals, when applied as coefficients to the 1974 total inputs at 1970 prices. No further claim is made about their accuracy, although they are derived from the 1969 EUROSTAT R44 distributions. The CSO say that exact Irish and United Kingdom equivalents of the EUROSTAT "ad valorem" and

"specific volumetric" taxes did not exist for 1969, nor indeed for 1974 either. Instead of the specified taxes and subsidies, we have used "taxes linked to production" for T42, "unallocated taxes" for T43, and all subsidies for T45. The basic 1969 data used appear in Appendix Four.

Table 18 shows indirect tax and subsidy rates for 1980, corresponding to Table 17. These tax and subsidy rates for 1985 are shown in Table 19. Tables 18 and 19 are consistent with the A - matrices shown in tables 13 and 14, respectively. Their entries were derived by scaling the necessary primary input aggregate in each column so as to make the sum of all entries in the column equal unity. Two futher rows of coefficients, for each year, were also included, namely employee compensation and gross profits, both at 1970 prices. In summary, the entries shown in Tables 18 and 19 emerged from scaling of five rows of primary input 1974 coefficients, so as to make the sum of all entries in each column (the A - matrix and the five rows) sum to unity, in both years (1980 and 1985).

TABLE 17 : IRELAND, T42, T43, T45, INDIRECT TAX RATES AND SUBSIDY RATES. PERCENTAGES FOR 1974

EXPLOR sector	T42 ad valorem indir. tax rates Per cent	T43 specific volumetric tax rates: Per cent	T45 ad valorem subsidy rate: Per cent
01. Ag., for., fish.	0.093	4.075	9.568
02. Meat	1.740	0.658	3.059
03. Dairy	1.149	0.741	27.440
04. Other food	1.910	0.647	0.231
05. Drinks	70.430	0.470	0.169
06. Tobacco	1.182	0.252	0.090
07. Coal and peat	1.838	0.033	0.015
08. Coke	2.632	0.141	0.052
09. Petrol	76.088	0.055	0.021
10. Electricity	2.632	0.144	0.059
11. Towns gas	2.632	0.141	0.052
13. Water	2.622	0.124	0.038
14. Ferrous met.	2.947	1.601	0.447
15. Non-ferrous	2.958	1.708	0.484
16. Metal prods.	5.771	0.889	0.314
17. Build. mats.	1.179	0.980	0.329
18. Construction	nil	0.304	0.122
19. Chemicals	5.527	0.989	13.350
20. Text. and cloth.	3.583	1.089	0.389
21. Leather and footw.	3.558	1.081	0.387
22. Wood and furn.	14.197	1.130	0.401
23. Paper and print.	6.298	0.815	0.322
24. Plastics and rubb.	13.721	0.523	0.191
25. Other manufac.	13.439	0.679	0.240
26. Ag. and ind. mach.	0.919	0.829	0.300
27. Office etc. mach.	3.831	2.027	0.720
28. Electrical goods	12.170	0.988	0.352
29. Motor veh.	10.533	0.833	0.303
30. Other trans. equip.	nil	0.683	0.867
31. Inland transport	nil	2.846	13.843
32. Mar.,air, aux.	nil	0.692	nil
33. Communic.	2.044	0.646	nil
34. Distrib.	nil	3.244	nil
35. Services	0.780	9.623	2.990

TABLE 18: IRELAND, T42, T43, T45, INDIRECT TAX RATES AND SUBSIDY RATES, PERCENTAGES FOR 1980

EXPLOR sector	T42 ad valorem indir. tax rates: Per cent	T43 specific volumetric tax rates: Per cent	T45 ad valorem subsidy rate: Per cent
01.	0.091	4.005	9.404
02.	1.449	0.548	2.548
03.	1.149	0.741	25.771
04.	1.218	0.413	0.147
05.	68.442	0.476	0.171
06.	70.377	0.241	0.086
07.	1.702	0.031	0.014
08.	2.632	0.141	0.052
09.	78.138	0.056	0.022
10.	2.722	0.149	0.061
11.	2.666	0.143	0.053
13.	2.458	0.116	0.036
14.	2.609	1.418	0.040
15.	2.480	1.432	0.406
16.	5.353	0.825	0.291
17.	1.131	0.940	0.316
18.	nil	0.279	0.112
19.	3.781	0.677	9.132
20.	3.832	1.165	0.416
21.	3.804	1.156	0.414
22.	13.746	1.094	0.388
23.	6.560	0.849	0.335
24.	13.101	0.499	0.182
25.	13.408	0.677	0.239
26.	0.662	0.598	0.216
27.	3.864	2.045	0.726
28.	11.071	0.899	0.320
29.	11.381	0.900	0.328
30.	nil	0.735	0.933
31.	nil	2.853	13.876
32.	nil	0.670	nil
33.	2.087	0.660	nil
34.	nil	3.294	nil
35.	0.786	9.700	3.014

TABLE 19: IRELAND, T42, T43, T45, INDIRECT TAX RATES AND SUBSIDY RATES. PERCENTAGES FOR 1985

EXPLOR sector	T42 ad valorem indirect tax rates: Per cent	T43 specific volumetric tax rates: Per cent	T45 ad valorem subsidy rates: Per cent
01.	0.088	3.867	9.078
02.	1.059	0.401	1.862
03.	1.149	0.741	24.853
04.	0.294	0.100	0.036
05.	69.113	0.481	0.173
06.	70.309	0.226	0.081
07.	1.521	0.027	0.012
08.	2.632	0.141	0.052
09.	79.944	0.058	0.022
10.	2.790	0.153	0.063
11.	2.670	0.143	0.053
13.	2.223	0.105	0.032
14.	2.195	1.192	0.333
15.	1.892	1.093	0.310
16.	4.832	0.744	0.263
17.	1.037	0.862	0.289
18.	nil	0.241	0.097
19.	1.294	0.232	3.125
20.	3.917	1.191	0.425
21.	3.956	1.202	0.430
22.	1.289	1.026	0.364
23.	6.753	0.874	0.345
24.	12.113	0.462	0.169
25.	13.155	0.665	0.235
26.	0.326	0.294	0.106
27.	3.857	2.041	0.725
28.	9.209	0.748	0.266
29.	12.122	0.959	0.349
30.	nil	0.776	0.985
31.	nil	2.844	13.832
32.	nil	0.641	nil
33.	2.118	0.669	nil
34.	nil	3.330	nil
35.	0.791	9.756	3.031

Table 20 shows T 72 data, the labour/output coefficients. Appendix Five gives details of how these coefficients were obtained for 1974 and projected to 1980 and 1985. There is doubt about the accuracy of many of the 1974 figures, because of lack of input-output sector data at the R 44 level. The estimates shown for 1980 and 1985, in Table 20, are tentative.

Average annual wage rates per manyear, at current prices, T 49, are shown in Table 21. Appendix Six gives details of how 1974 rates were estimated and projected to 1980 and 1985. The estimates for the latter two years are tentative, just like the labour/output coefficients. Sectors 08. coke and 12. radio-active materials have no employment in Ireland for the years being considered. Wage rates as shown implicitly take account of productivity increases since 1970.

Table 22 gives T 87 estimates, namely estimated (start-up) price indices for domestic production. For some 1974 sectors, such as agriculture, direct comparison of value and volume indices based on 1970 was possible, thereby providing implied price indices. For industrial sectors generally, annual census results for 1974 have either been not available, or are classified according to NACE-CLIO groupings, without comparable 1970 figures. The method used for these sectors generally was to compare 1973 and 1970 annual census volume and value results, thus getting three-year price changes, and then scaling up these to give a four-year estimate. Further direct comparisons between 1974 and 1970 are the Consumer Price Index and the Wholesale Price Index, both of which appear quarterly in the Irish Statistical Bulletin. The National Accounts for various service sectors give GNP components by sector of origin (eg., wages and salaries, profits, depreciation) at current and at 1970 prices, thus providing further price indicators, although these are not precisely the type required.

TABLE 20: IRELAND, T72, LABOUR/OUTPUT COEFFICIENTS, IN MAN YEARS PER £ MILLION AT 1970 PRICES, FOR 1974, '80 AND '85

EXPLOR sector	Labour/output coefficients for 1974	Labour/output coefficients for 1980	Labour/output coefficients for 1985
01. Ag. for. fish.	584.85	440.00	300.00
02. Meat etc.	80.59	65.30	50.01
03. Dairy	134.29	126.04	117.79
04. Other food	122.37	101.40	80.43
05. Drinks	58.04	41.41	35.00
06. Tobacco	24.55	16.37	15.00
07. Coal and peat	618.71	510.00	400.00
08. Coke	nil.	nil.	nil.
09. Petrol	5.932	5.247	4.562
10. Electric.	157.52	111.31	100.00
11. Townsgas	277.06	185.18	160.00
13. Water	462.61	462.61	462.61
14. Ferrous mets.	217.37	196.41	175.45
15. Non-ferrous	70.59	70.59	70.59
16. Metal prods.	271.30	264.58	257.86
17. Build. mats.	160.83	122.20	100.00
18. Construction	304.84	229.40	190.00
19. Chemicals	118.21	95.48	72.75
20. Text. and Cloth.	234.75	169.56	150.00
21. Leather and foot.	293.26	253.10	212.94
22. Wood and furn.	247.03	226.63	206.23
23. Paper and print,	261.38	237.60	213.82
24. Plast. and rubber	217.99	217.99	217.99
25. Other manuf.	268.68	238.84	209.00
26. Ag. and ind. mach.	195.01	195.01	195.01
27. Office etc. mach.	149.50	106.30	106.30
28. Electr. goods	212.50	199.06	185.62
29. Motor veh.	154.85	154.85	154.85
30. Other transp. equ.	322.24	276.94	231.64
31. Inland transp.	439.95	330.00	220.00
32. Mar./air/aux.	189.07	175.00	160.00
33. Communic.	491.16	400.00	280.00
34. Distribut.	725.84	547.36	350.00
35. Services	421.20	360.00	299.31

TABLE 21 : IRELAND, T-19, AVERAGE ANNUAL WAGE RATE PER EMPLOYEE, AT CURRENT PRICES, FOR 1974, '80 AND '85

EXPLOR sector	Wages and Salaries per Paid Employee: £		
	for 1974	for 1980	for 1985
01. Ag. for., fish.,	969.00	2 741	5 208
02. Meat	2133.21	5 119	10 494
03. Dairy	2227.14	5 122	10 244
04. Other food	1835.00	4 037	7 670
05. Drinks	2860.11	6 578	13 156
06. Tobacco	2535.43	5 831	11 662
07. Coal and peat	2152.76	4 521	8 138
08. Coke	nil	nil	nil
09. Petrol	3001.21	6 902	13 804
10. Electricity	2724.84	5 995	11 390
11. Towns gas	2200.78	4 402	7 704
12. Radio-active	nil	nil	nil
13. Water	1769.96	3 894	7 399
14. Ferrous met	2022.83	4 248	7 646
15. Non-ferrous	2952.68	6 201	11 162
16. Metal prods.	2021.01	4 244	7 639
17. Build. mats.	2203.79	4 628	8 330
18. Construction	1934.38	3 868	6 769
19. Chemicals	2396.39	5 750	11 787
20. Textiles and Cloth.	1469.57	3,381	6 762
21. Leath. and footw.	1464.45	2 928	5 124
22. Wood and furn.	1573.32	3 303	5 945
23. Paper and print.	2119.13	4 450	8 010
24. Plastics and rubb.	2117.32	5 081	10 416
25. Other manufac.	1925.40	4 428	8 856
26. Ag. and inds. mach.	1831.35	3 662	6 409
27. Office etc. mach.	1810.92	3 622	6 339
28. Electrical goods	1554.58	3 110	5 443
29. Motor veh.	2192.43	4 384	7 672
30. Other transp. equip.	2404.74	5 291	10 053
31. Inland transp.	2850.14	5 985	10 773
32. Mar., air, aux.	3802.75	8 367	15 897
33. Communic.	1766.45	3 532	6 181
34. Distrib.	1147.71	2 296	4 018
35. Services	2519.87	5 544	10 534

TABLE 22: IRELAND, T 87, NOMINAL PRICE INDEX NUMBERS OF DOMESTIC PRODUCTION, FOR 1974, '80 and '85

EXPLOR sectors.	Price indices for domestic production		
	Based on 1.0 for 1970		
	for 1974	for 1980	for 1985
01. Agric. for., fish	1.6451	4.0	6.4
02. Meat etc.	1.8199	3.9	6.0
03. Dairy	2.1964	4.1	6.0
04. Other food	1.4706	3.7	6.0
05. Drinks	1.6501	3.6	5.5
06. Tobacco	1.20	3.3	4.8
07. Coal	2.4460	4.2	6.0
08. Coke	1.8156	3.4	5.0
09. Petrol	4.3050	8.2	12.0
10. Electricity	1.9934	5.5	9.0
11. Towns gas	1.8252	5.6	9.0
12. Radio-active	2.5	4.0	5.5
13. Water	1.5794	3.2	4.8
14. Ferrous metals	1.4029	3.2	5.0
15. Non-ferrous	1.8372	3.4	5.0
16. Metal products	1.5851	3.0	4.5
17. Build. mats.	1.4209	4.2	7.0
18. Construction	1.7158	3.6	5.5
19. Chemicals	1.4216	3.1	4.8
20. Textiles + Clothing	1.4369	2.9	4.5
21. Leather + footwear	1.8182	3.4	5.0
22. Wood and furniture	2.1411	3.8	5.5
23. Paper and printing	1.5962	3.3	5.0
24. Plastics and rubber	2.1715	3.6	5.0
25. Other manufact.	1.4135	3.2	5.0
26. Ag. and indust. mach.	1.7841	3.4	5.0
27. Office etc. mach.	1.7841	3.4	5.0
28. Electrical goods	1.6867	3.4	5.0
29. Motor vehicles	1.4113	2.1	4.8
30. Other transp. equip.	1.4204	3.1	4.8
31. Inland transport	1.4930	4.5	7.5
32. Mar., air, aux. transp.	1.5792	4.6	7.5
33. Communications	1.5472	3.5	5.5
34. Distribution	1.5472	3.5	5.5
35. Services	1.6666	3.6	5.5

The 1980 and 1985 projections shown in Table 22 are tentative, being extrapolitions of the movement between 1970 and 1978. The growth between 1980 and 1985 is assumed to be roughly the same as that between 1974 and 1980 and to be additive, not exponential.

Table 23 gives T 94 results, which are gross profit margins as percentages of domestic outputs at current prices. These initial or "start-up" values are derived indirectly from the 35-sector version of the CSO 1969 R 44 transactions table used as basic data in all the present exercises. The 1974 National Accounts data, at 1970 prices and at the level of 5 major sub-divisions, were used to scale the first estimates of Gross Profits, obtained by applying 1969 coefficients to 1974 estimated total inputs at 1970 prices. To allow for self-employed in Agriculture being treated by the EXPLOR model as paid employees, the profits coefficient in sector 01. is set at 24 per cent. All the other T 94 percentages for 1974 are calculated directly from 1974 data of Table A7.1 as the ratio of column (2) to column (6). The complete set of 1974 primary input values, in £ million at 1970 prices, is shown in Appendix Seven table A7.1. The 1980 and 1985 values for T 94 are chosen to be the same as those of 1974, which had lean rather than fat profits.

For T 90, weights on prices for the minimisation procedure, 0.2 was used for all sectors and years, as was used for France.

For T 91, weights on profits, 1.0 was used for all sectors and years, as was also used for France.

TABLE 23: IRELAND, T94, FIRST ESTIMATE GROSS PROFIT MARGINS AS PERCENTAGES OF DOMESTIC OUTPUT, AT CURRENT PRICES, 1974, 1980, 1985

EXPLOR sector	1974		
01. Agric., for., fish.	24.000	24.00	24.00
02. Meat etc.	2.228	2.23	2.23
03. Dairy	2.816	2.82	2.82
04. Other food	3.215	3.22	3.22
05. Drinks	6.423	6.42	6.42
06. Tobacco	3.297	3.30	3.30
07. Coal and peat	23.622	23.62	23.62
08. Coke	0.0	0.0	0.0
09. Petrol,	0.809	0.81	0.81
10. Electricity	22.329	22.33	22.33
11. Towns gas	7.248	7.25	7.25
13. Water	2.824	2.82	2.82
14. Ferrous metals	5.626	5.63	5.63
15. Non-ferrous	19.461	19.46	19.46
16. Metal prods.	7.909	7.91	7.91
17. Build. mats.	11.787	11.79	11.79
18. Construction	3.114	3.11	3.11
19. Chemicals	13.902	13.90	13.90
20. Textiles and clothing	5.641	5.64	5.64
21. Leather and footwear	5.139	5.14	5.14
22. Wood and furniture	4.988	4.99	4.99
23. Paper and printing	7.582	7.58	7.58
24. Plastics and rubber	6.515	6.52	6.52
25. Other manufact.	5.509	5.51	5.51
26. Ag. and indust. mach.	7.443	7.44	7.44
27. Office etc. mach.	16.508	16.51	16.51
28. Electrical goods	8.158	8.16	8.16
29. Motor vehicles	3.662	3.66	3.66
30. Other transp. equip.	3.179	3.18	3.18
31. Inland transport	18.235	18.24	18.24
32. Mari.,air, aux. transp.	14.972	14.97	14.97
33. Communications	21.769	21.77	21.77
34. Distribution	27.902	27.90	27.90
35. Services	24.506	24.51	24.51

FURTHER PARAMETERS REQUIRED (5 data-sets)

The following scheme sets out the final 5 data-sets required for operating the EXPLOR model.

Table Number	Dimension rows x cols.	Unit	Symbol	Definition
T 15	1 x k			Indicator of choice of treatment of investment; 0, 1 or 2 for each element. 0 endogenous, 1 exog. at constant prices, 2 exog. at current prices
T 16	1 x n			Indicator of choice of treatment of exports; 0 endogenous; 1 exogenous at constant prices, for each element.
T 18	1 x n			Indicator of choice of treatment of imports; 0 endogenous; 1 exogenous at constant prices; for each element
T 40	1 x n			Aggreg. code to change from n - commod. classific. to k-commod. used for investment. Each element indicates which is the corresponding element of the k-vector
T 86	1 x n			Indicator of choice of treatment of employment in each sector, use 1.0 if productivity is exogenous (Table 72).

For T 15, treatment of investment, all 23 elements (k = 23) should have value 1 meaning that investment is determined exogenously.

For T 16, treatment of exports, each of the 35 elements should have value 1, meaning that exports are specified exogenously, at 1970 prices.

For T 18, treatment of imports, each of the 35 elements should have value 1, meaning exogenous at 1970 prices.

For T 40, we have followed the French aggregation code of change from the 35-sector commodity classification to the 23-sector classification used for investment; the French code is indicated in Table 3, page 98, "The Users Guide of the EXPLOR Model", Battelle Report 054-76 EMD. The corresponding T 40 scheme for Ireland appears as Table 24.

TABLE 24: IRELAND, T 40, AGGREGATION CODES FOR 35-SECTOR PRODUCTION TO GIVE 23-SECTOR INVESTMENT. CODE NUMBERS SHOW CORRESPONDING ELEMENT OF 23-SECTOR INVESTMENT MATRIX

EXPLOR sector	Aggregation Code	EXPLOR sector	Aggregation Code
01. Agriculture etc.	01	19. Chemicals	10
02. Meat	02	20. Textiles and clothing	14
03. Dairy	02	21. Leather & footwear	15
04. Other food	03	22. Wood and furniture	16
05. Drinks	03	23. Paper & printing	17
06. Tobacco	03	24. Plastics & rubber	18
07. Coal and peat	04	25. Other manufactures	16
08. Coke	04	26. Ag. & Indus. mach.	12
09. Petrol	05	27. Office etc. machinery	12
10. Electricity	06	28. Electrical goods	12
11. Towngas	06	29. Motor vehicles	13
12. Radio-active	06	30. Other transport equip.	13
13. Water	06	31. Inland transport	21
14. Ferrous metals	07	32. Mar., air, aux. transp.	21
15. Non-ferrous	08	33. Communications	22
16. Metal products	11	34. Distribution	20
17. Building materials	09	35. Services	23
18. Construction	19		

For T 86, the treatment of employment, each of the 35 elements has a value 1, meaning that productivity is exogenous, as set out in T 72.

APPENDIX ONE: THE LINEAR EXPENDITURE SYSTEM (LES)

In this appendix, five aspects of the Irish LES data presented in Table 2 are considered:

(i) the basic data used for estimating b and c;

(ii) the model of the LES system, as per Bridge (1971);

(iii) computing the estimates, by iteration;

(iv) convergence of the b and c estimates;

(v) comparison of model estimates with actual figures.

(i) The basic data used for estimating b and c

Table A1.1 shows the 35-sector expenditure by households, as submitted to the computer program. Data for only five years, 1970-1974, were available at current prices and at 1970 prices. Where possible, the EUROSTAT National Accounts Table 5 data were used directly, with or without aggregation. For example, the Table 5 item 15, tobacco, is directly usable, as are the aggregates for "final consumption of households". Many other items of Table 5, however, had to be broken down and re-assembled in the groups required for the EXPLOR 35-sector model. This re-assembly work was done by the Central Statistics Office, Dublin, with direction and collaboration of the author. Because of the data limitations, it has been decided to estimate b and c for these 35 sectors only, without separate estimation for sub-sectors. There is admittedly a shortage of information for the consumption functions.

(ii) The model chosen to represent the LES system

The model and method used were those set out in pages 88 to 92 of BRIDGE, J L. (1971), Applied Econometrics, North-Holland; Stone's suggested iterative procedure, based on Ordinary Least Squares, was applied. In order to permit substitution between commodities, no constraint was placed on negative signs arising for b-components.

Table A1.1: Ireland, Household Expenditure 1970-74 at current prices and at 1970 prices: SUMMARY TABLE for 35 EXPLOR SECTORS

EXPLOR sector		At current prices (£ million)					At 1970 prices (£ million)				
		1970	1971	1972	1973	1974	1970	1971	1972	1973	1974
01.	ag/for/fish.	78.9	82.9	93.7	109.8	123.5	78.9	79.6	77.2	77.7	81.1
02.	meat etc.	74.6	83.1	99.4	131.2	150.4	74.6	76.5	80.2	83.6	89.0
03.	dairy	33.9	34.9	35.6	38.7	47.7	33.9	31.5	30.1	28.5	29.6
04.	other food	119.9	136.8	157.1	179.7	216.4	119.9	123.9	131.0	137.5	134.3
05.	drinks	119.5	133.7	147.0	171.6	209.0	119.5	123.1	129.5	135.6	150.0
06.	tobacco	80.0	84.7	88.9	100.5	111.0	80.0	81.8	85.8	89.5	96.2
07.	coal + peat	14.5	16.6	19.5	21.4	26.3	14.5	14.9	15.6	16.2	13.9
08.	coke	0.6	0.4	0.3	0.3	0.2	0.6	0.4	0.3	0.2	0.1
09.	petroleum	42.4	52.2	62.5	73.6	101.1	42.4	47.7	54.1	60.3	62.4
10.	electricity	25.0	27.2	29.9	34.8	52.6	25.0	26.4	28.4	30.4	31.9
11.	townsgas	4.4	5.0	5.2	5.1	8.8	4.4	4.5	4.6	4.6	4.8
12.	radio active*										
13.	water	3.3	3.8	4.0	4.8	5.8	3.3	3.4	3.6	3.8	3.9
14.	ferrous	1.1	1.2	1.2	1.3	1.4	1.1	1.1	1.1	1.1	1.1
15.	nonferrous	0.7	0.7	0.8	0.9	1.0	0.7	0.7	0.7	0.8	0.8
16.	metal prods	19.2	21.2	23.1	26.8	33.2	19.2	19.5	20.4	21.3	22.5
17.	build. mats.	0.5	0.5	0.7	0.8	0.9	0.5	0.5	0.6	0.6	0.6
18.	construction*										
19.	chemicals	26.2	31.7	37.8	46.3	53.6	26.2	29.7	33.8	37.9	39.3
20.	text. + cloth.	112.5	137.2	171.1	220.3	250.4	112.5	125.5	141.3	156.6	148.6
21.	leath. + footw.	20.1	22.5	25.8	32.7	39.9	20.1	20.4	21.2	22.0	23.0
22.	wood + furn.	19.4	22.7	28.7	37.1	44.1	19.4	20.9	23.5	25.7	24.4
23.	paper + paint	28.0	35.7	44.4	50.3	58.5	28.0	30.8	34.4	37.9	36.0
24.	plast. + rubber	18.3	21.1	23.8	28.0	34.5	18.3	19.4	21.0	22.6	23.9
25.	other manufac.	15.6	17.3	19.8	22.9	25.0	15.6	16.3	17.5	18.6	19.2
26.	ag. + ind. mach.	4.1	4.3	4.6	5.0	5.8	4.1	4.1	4.2	4.3	4.4
27.	office etc mach.	3.1	3.2	3.5	3.8	4.5	3.1	3.1	3.2	3.3	3.4
28.	electr. goods	28.4	31.7	36.0	41.7	44.8	28.4	30.4	33.0	35.6	34.0
29.	motor vehs.	38.0	46.3	55.4	65.9	61.8	38.0	41.1	45.2	49.1	40.9
30.	other tr. eq.	1.8	2.1	2.5	3.1	3.2	1.8	1.9	2.1	2.3	2.1
31.	inland transp.	14.8	17.4	19.0	22.4	25.2	14.8	14.6	14.7	14.8	14.7
32.	mar/air/aux.	6.1	7.2	8.1	9.6	10.8	6.1	6.1	6.3	6.4	6.3
33.	communic.	8.4	9.6	9.5	11.3	12.0	8.4	8.6	8.6	8.9	8.0
34.	distribution										
35.	services	191.0	199.8	220.4	230.1	251.6	191.0	178.7	171.1	162.9	157.6
	TOTAL	1 154.3	1 294.7	1 479.3	1 731.8	2 015.0	1 154.3	1 187.1	1 244.3	1 300.6	1 308.0

* To be omitted, because having all zero entries, from the LES parameter estimation; thus 32 entries are left.

(iii) Computing the estimates of b and c

A printout of the core of the computer program (in Fortran IV G) designed by the author and his ESRI colleague J. McGregor is below. The program reads in exogenous first estimates of c, per head of population, and then does the Stone iterative OLS procedure for a specified number of times, printing out c and b estimates each time. In the following printout, we omit reading and printing routines and use of final b and c estimates to compute the vectors of expenditure.

FORTRAN IV G PROGRAM

```
      INTEGER T
      DIMENSION G(75),B(75),DY(10),Y(10),P(75,10),Q(75,10),D(75,10),
     1          W(75,10),DUMM1(10),DUMM2(10),V(75,10),POP(10)
      KCOUNT=0
C
C   G  CONTAINS OUR ESTIMATES FOR GAMMA - THE SUBSISTENCE QUANTITY
C   P  CONTAINS THE PRICE INDICES
C   Q  CONTAINS THE QUANTITY - OR VALUE AT CONSTANT PRICES
C   DY IS THE SUPERNUMARY INCOME
C   B  CONTAINS OUR ESTIMATES FOR BETA
C   THERE ARE **I** SECTORS (RUNNING FROM 1 TO I)
C   THERE ARE **T** YEARS   (RUNNING FROM 1 TO J)
C
C
C   FIRST READ IN ALL THE DATA:  TIME,SECTORS, V, THEN  Q,
C   FOLLOWED BY POPULATION AND ESTIMATED G VALUES
C
      READ(5,100)T
      READ(5,100)N
      DO 20 J=1,T
   20 READ(5,101)(V(I,J),I=1,N)
      DO 21 J=1,T
   21 READ(5,101)(Q(I,J),I=1,N)
      READ(5,101)(POP(J),J=1,T)
      READ(5,101)(G(I),I=1,N)
  100 FORMAT(5X,I5)
  101 FORMAT(7F10.4)
  102 FORMAT(1H0,4(10F10.4/1H ))
C
C   THEN FORM Y, P, AND DIVIDE BY POPULATION
C
      DO 22 J=1,T
      Y(J)=0.0
      DO 22 I=1,N
      P(I,J)=V(I,J)/Q(I,J)
      V(I,J)=V(I,J)/POP(J)
      Y(J)=Y(J)+V(I,J)
   22 Q(I,J)=Q(I,J)/POP(J)
C
C   NOW CALCULATE DEPENDENT VBLE  D  AND
C   INDEPENDENT VBLE  DY
C
 9999 CONTINUE
      WRITE(6,102)(G(I),I=1,N)
      DO 11 J=1,T
      PGSUM=0.0
      DO 10 I=1,N
      D(I,J)=V(I,J)-P(I,J)*G(I)
   10 PGSUM=PGSUM+P(I,J)*G(I)
   11 DY(J)=Y(J)-PGSUM
C
C   GET B VALUES AND SCALE THEM
C
      DO 12 I=1,N
      DO 13 J=1,T
   13 DUMM1(J)=D(I,J)
   12 CALL SIMREG(DUMM1,B(I),DY,T)
      CALL SCALE(B,N)
      WRITE(6,102)(B(I),I=1,N)
C
C   CALCULATE  W - THE NEW DEPENDENT VBLE AND REVISED ESTIMATES FOR G
C
      DO 14 I=1,N
      DO 15 J=1,T
      W(I,J)=V(I,J)-B(I)*DY(J)
      DUMM1(J)=W(I,J)
   15 DUMM2(J)=P(I,J)
   14 CALL SIMREG(DUMM1,G(I),DUMM2,T)
      KCOUNT=KCOUNT+1
      IF (KCOUNT.LT.60) GO TO 9999
      STOP
      END
```

```
C
C   THIS ROUTINE CALCULATES A SIMPLE OLS REGRESSION COEFFICIENT
C   THE MODEL BEING OF THE FORM  Y=AX
C   N IS THE NUMBER OF OBSERVATIONS -- MAXIMUM OF 10
C
      SUBROUTINE SIMREG(Y,A,X,N)
      DIMENSION Y(10),X(10)
      XSUM=0.0
      YSUM=0.0
      DO 10 I=1,N
      XSUM=XSUM+X(I)*X(I)
   10 YSUM=YSUM+Y(I)*X(I)
      A=YSUM/XSUM
      RETURN
      END


C
C   THIS ROUTINE SCALES A VECTOR V OF LENGTH N SO THAT IT SUMS TO UNITY
C
      SUBROUTINE SCALE(V,N)
      DIMENSION V(75)
      VSUM=0.0
      DO 10 I=1,N
   10 VSUM=VSUM+V(I)
      DO 11 I=1,N
   11 V(I)=V(I)/VSUM
      RETURN
      END
```

(iv) Convergence of the b and c estimates

The trend of the convergence during 300 iterations is shown in Table A1.2, where three sets of estimates of both the c and b vectors are shown. It is apparent that the last 150 iterations of the 300 produced little change in the b-ratios. But these same 150 iterations did produce a few noticeable changes in the c-values, especially for 02. meat (-0.74); 05. drinks (-0.78); 20. textiles and clothing (-1.92); 35. services (+1.72). It was decided to use the results of 300 iterations as the 5-year data did not warrant greatly refined estimates.

We find indeed generally that if c increases for one sector (e.g., 03. dairy) during repeated iteration, there is a compensatory reduction in the corresponding b-values. The converse is illustrated by sector 02. meat, which shows c steadily decreasing for b steadily increasing. Thus it is generally true that the net result of using different sets of c and b joint estimates with given aggregate household expenditure amounts may not show nearly so much variation as b alone or c alone would suggest. This is another reason for not continuing the iterations many hundreds or thousands of times.

Table A1.2: Estimation of b and c parameters for the Irish linear expenditure system, based on 1970-74 data; 35-sector EXPLOR version (Per capita at 1970 prices)

	c, Subsistence amounts, £			b, Shares of supernumerary		
	Initial	After 150 iterations	After 300 iterations	Initial	After 150 iterations	After 300 iterations
01. ag/for/Fish	25.00	27.39	27.47	.021	-0.026	-.0249
02. meat etc.	24.86	20.99	20.25	.058	0.130	.1339
03. dairy	9.00	12.97	13.24	.017	-0.059	-.0590
04. other food	39.96	37.57	37.08	.073	0.111	.1104
05. drinks	39.83	34.66	33.88	.099	0.179	.1773
06. tobacco	26.66	24.76	24.49	.046	0.071	.0689
07. coal and peat	4.83	4.61	4.54	.002	0.006	.0066
08. coke	0.03	0.27	0.28	.001	-0.004	-.0038
09. petrol	14.13	10.32	9.71	.095	0.154	.1528
10. electricity	8.33	7.45	7.32	.029	0.041	.0403
11. townsgas	1.46	1.51	1.51	.001	0.000	.0003
12. radio-active						
13. water	1.10	1.00	0.98	.002	0.004	.0039
14. ferrous	0.36	0.38	0.38	.000	0.000	-.0003
15. non-ferrous	0.23	0.21	0.21	.000	0.001	.0006
16. metal prods.	6.40	5.87	5.79	.011	0.019	.0193
17. build mats.	0.16	0.14	0.14	.001	0.001	.0008
18. construction						
19. chemicals	8.73	6.39	6.03	.057	0.091	.0894
20. text. + cloth.	37.50	27.20	25.28	.214	0.392	.3963
21. leather + footwear	6.70	6.09	5.97	.011	0.022	.0228
22. wood + furn.	6.46	4.69	4.35	.031	0.063	.0646
23. paper + print.	9.33	7.76	7.48	.046	0.072	.0711
24. plast. + rubber	6.10	5.10	4.95	.022	0.038	.0371
25. Other man.	5.20	4.67	4.59	.014	0.021	.0209
26. Ag + indust.m.	1.36	1.35	1.35	.001	0.001	.0009
27. Office etc. m.	1.03	1.00	1.00	.001	0.001	.0012
28. elect. goods	9.46	8.73	8.60	.028	0.037	.0360
29. motor veh.	12.66	12.57	12.49	.036	0.034	.0323
30. other trans.equ.	0.60	0.53	0.52	.002	0.003	.0029
31. inland transp.	4.86	5.18	5.21	.000	-0.007	-.0069
32. mar/air/aux.	2.03	2.06	2.06	.001	0.000	.0002
33. communic.	2.50	3.00	3.02	.005	-0.004	-.0040
34. distribution						
35. services	51.00	75.07	76.79	.075	-0.392	-.3920
TOTAL	367.86	361.49	356.96	1.000	1.000	0.9999

Table A1.3: Ireland, Household Expenditure Estimates for 1970-1974, derived from c and b parameters resulting from 300 iterations

EXPLOR Sectors	At current prices (£ million)					At 1970 prices (£ million)				
	1970	1971	1972	1973	1974	1970	1971	1972	1973	1974
01. Ag. for,fish.	78.3	82.0	95.4	111.0	121.2	78.3	78.7	78.6	78.5	79.6
02. meat etc.	73.4	83.5	103.6	141.4	152.3	73.4	76.9	83.6	90.1	90.1
03. dairy	32.9	35.6	35.5	37.9	46.2	32.9	32.1	30.0	27.9	28.7
04. other food	120.6	137.1	156.3	178.4	221.1	120.6	124.1	130.4	136.5	137.2
05. drinks	118.1	133.5	149.8	178.3	196.7	118.1	122.9	132.0	140.9	141.2
06. tobacco	79.2	84.4	88.5	100.3	103.6	79.2	81.5	85.4	89.3	89.8
07. coal + peat	14.1	16.0	18.5	20.2	29.1	14.1	14.4	14.8	15.3	15.4
08. coke	0.4	0.3	0.2	0.0	0.1	0.4	0.4	0.2	0.0	0.1
09. petroleum	44.4	52.4	63.5	75.6	99.6	44.4	47.9	55.0	61.9	61.5
10. electricity	25.7	27.6	30.4	35.3	51.0	25.7	26.8	28.8	30.9	30.9
11. townsgas	4.5	5.0	5.2	5.2	8.7	4.5	4.6	4.6	4.7	4.7
12. radio-active										
13. water	3.3	3.8	4.0	4.8	5.7	3.3	3.4	3.6	3.8	3.8
14. ferrous	1.1	1.2	1.2	1.3	1.4	1.1	1.1	1.1	1.1	1.1
15. non-ferrous	0.7	0.7	0.8	0.9	1.0	0.7	0.7	0.7	0.8	0.8
16. metal products	19.0	21.3	23.4	27.4	32.2	19.0	19.6	20.7	21.7	21.8
17. build. mats.	0.5	0.5	0.7	0.8	0.9	0.5	0.5	0.6	0.6	0.6
18. construction										
19. chemicals	27.0	31.0	37.2	45.6	50.5	27.0	29.0	33.2	37.3	37.1
20. text. + cloth.	115.4	136.0	173.1	226.4	269.3	115.4	124.4	142.9	160.9	159.8
21. leath. + footw.	19.9	22.7	26.6	34.2	40.1	19.9	20.6	21.8	23.0	23.1
22. Wood + furniture	19.5	22.8	29.3	38.9	48.4	19.5	21.0	24.0	27.0	26.8
23. paper + print	29.4	36.1	44.6	50.3	61.4	29.4	31.1	34.5	37.9	37.8
24. plast. + rubber	18.4	21.0	24.0	28.4	33.1	18.4	19.3	21.2	23.0	22.9
25. other man.	15.7	17.3	19.6	22.7	24.1	15.7	16.3	17.4	18.4	18.5
26. ag. + ind. mach.	4.1	4.3	4.6	5.0	5.7	4.1	4.1	4.2	4.3	4.3
27. office etc. m.	3.1	3.2	3.5	3.8	4.4	3.1	3.1	3.2	3.3	3.3
28. electr. goods	29.0	31.4	34.9	39.6	44.7	29.0	30.1	32.0	33.9	34.0
29. motor vehs.	40.1	46.4	52.8	60.3	68.3	40.1	41.2	43.1	44.9	45.2
30. other transp.	1.8	2.1	2.5	3.0	3.4	1.8	1.9	2.1	2.2	2.2
31. inland transp.	14.6	17.5	18.8	21.8	25.1	14.6	14.7	14.5	14.4	14.7
32. mar/air/aux.	6.1	7.3	8.0	9.5	11.0	6.1	6.2	6.2	6.3	6.4
33. communic.	8.5	9.5	9.3	10.6	12.8	8.5	8.5	8.4	8.4	8.5
34. distribution										
35. Services	185.5	201.3	213.1	213.8	249.1	185.5	180.0	165.5	151.4	156.1
TOTAL	1 154.3	1 294.8	1 478.9	1 732.7	2 022.2	1 154.3	1 187.1	1 244.3	1 300.6	1 308.0

(v) Comparison of Model Estimates with Actual Figures

Table A1.3 gives the computed estimates for all five years, at current and at constant (1970) prices. These were obtained by using the c and b parameters resulting from 300 iterations, together with the population data for each of the five years 1970-74, namely 2.944, 2.978, 3.014, 3.051 and 3.086 million persons, respectively.

By definition, the aggregate annual expenditure at 1970 prices is fully accounted for by the model's estimates; thus the Table A1.3 aggregates at 1970 prices (£1154.3 million and so on) agree perfectly with corresponding aggregates of Table AI.I. The model requires no such agreement of aggregates at current prices; but we find the model giving results extremely close to the actual figures, the largest difference being an over-estimate of £7 million for 1974, at current prices.

In making row by row comparisons of model estimates and actual values, at current prices, some six rows show relatively large differences. The 1973 value for 02. (meat) is over-estimated by some 10 units, the unit being £1 million. The 1974 value for 05. (drinks) is under-estimated by some 12 units; likewise the 1974 value for 06. (tobacco) is under-estimated by some 7 units. Row 20. (textiles and clothing) has an over-estimate of 6 units for 1973 and 19 units for 1974. Row 29. (motor vehicles) is under-estimated by 6 units for 1973 and over-estimated by 6 units for 1974. Row 35. (services) is under-estimated by 7 units for 1972 and 16 units for 1973, with close agreement for 1974.

At 1970 prices the 1973 value of 02 (meat) is again over-estimated, by 6 units. The 1974 value of 05. (drinks) is again under-estimated, by about 9 units. Also the 1974 value for 06. (tobacco) is under-estimated by 6 units. Row 20. (textiles) has an over-estimate of 4 units for 1973 and 11 units for 1974, both in agreement with the outcome at current prices. Row 29 (motor vehicles)

has an under-estimate of some 4 units for 1973 and over-estimate of about 4 units for 1974, both errors in agreement with current-price results. Finally, row 35. (services) has an under-estimate of 6 units for 1972, of 12 units for 1973, and shows close agreement for 1974; all of which are in harmony with current-price results.

A general conclusion is that the model behaves satisfactorily, for the small amount of data submitted to it and for the doubts surrounding the accuracy of some of the entries. Row 35 (services) is perhaps the least satisfactory; it shows a reasonable-looking growth at current prices, between 1970 and 1974, but at 1970 prices it declines steadily during the period. There might be over-excessive deflation of the current-price estimates, as one reason for this apparent decline. But only a full and accurate 1974 input-output table would reveal better estimates of household consumption of this and other items, even at current prices.

But for EXPLOR work, it has been decided to modify the b coefficients of A1.2, so as to set negative values at zero level and scale down all positive entries to add to unity. These revised estimates appear as column (3) of Table 2 of the main report.

APPENDIX TWO: MACRO-PROJECTIONS TO 1980 and 1985 AND RAS MULTIPLIERS

No definitive projections or forecasts for 1980 and 1985 have been available to the author up to the time of preparation of this draft report. But EURECA MULTINATIONAL projections have become available and are used in the ways described in this appendix and in Block Two of the draft report. Some official projections have been made of GDP, in connection with energy forecasting, but these merely suggest three possible growth-rates: a high rate, a medium rate and a low rate. The medium rate, considered to be "most likely", is about 3 per cent compound per annum between 1976 and 1985, meaning roughly 30 per cent added to the 1976 level, by 1985.

Working at 1970 prices we apply 1.30 to the 1976 GDP which is £1982 million, to get roughly £2577 million for 1985. But the EURECA estimate for 1985 is £2854 million. Thus we establish a range of £300 million up to £2860 million, within which our aggregate projected GNP should fall, for 1985. The methodology of getting the 1980 and 1985 detailed projections, as shown in Table A2.2, will be explained in this present appendix.

Sources of Data

Three main sources of data were used:

1. EURECA projections for Ireland's GDP to 1985, at 1970 prices, in conjunction with GDP projections for all EEC countries; prepared by DULBEA, BRUSSELS, February 1980.
2. National Income and Expenditure 1975, compiled by Central Statistics Office and published by the Stationery Office, Dublin, 1977. This gave the six main components of GNP expenditure (at 1970 prices) for 1969 and 1974.
3. Economic Review and Outlook, Summer 1979, compiled by the Department of Finance and published by the Stationery Office, Dublin, 1979. This gave estimates of GNP components for 1974 and 1978 at 1975 prices.

Methodology and Assumptions used for the projections

The methodology is simple. We look at the growth-rate of each of the six components of GDP between 1969 and 1974 and again between 1974 and 1978 and use these growth-rates to project each component to 1980 and then to 1985.

The main assumption is that a growth of 3 per cent will apply to the Irish economy between 1978 and 1985. The rates of relative increase of components are taken to be similar to those between 1974 and 1978, unless better information suggests changes. But growth will be slower during 1979-85. Thus GDP for 1985 would be £2577 million at 1970 prices. Table A2.2 shows details. This 1985 projection of GDP is within the range £2560-2860 million quoted above. Latest available information has been used to estimate component growth between 1978 and 1980, for example, reduced government current expenditure.

Summary of base data used

Table A2.1 following summarises the GNP components used as basis of the projections to 1980 and 1985.

TABLE A2.1: IRISH GDP COMPONENTS AND GROWTH-RATES AT 1970 PRICES

GDP component	For 1969 (1)	For 1974 ≠ (2)	For 1978 (3)	Ratio of 1974 to 1969 (2)/(1)	Ratio of 1978 to 1974 (3)/(2)
	£ million at 1970 prices			(4)	(5)
Personal expenditure	1111.7	1308	1474	1.177	1.127
Government current expenditure	222.6	316	373	1.420	1.179
Gross fixed capital formation	360.4	446	532	1.238	1.192
Changes in stocks	38.8	48	7	1.237	0.144
Exports of goods and services	573.5	753	1114	1.313	1.479
Less Imports of goods and services	-711.8	-946	-1238	1.329	1.309
GDP Total	1595.2	1925	2262	1.207	1.175

≠ not identical with Appendix 7 figures, which have not been revised.

Projections to 1980 and 1985

Table A2.2 following shows how the 1980 and 1985 components of GDP are estimated and the assumed growth-rates used. The 1980 change in stocks is taken to be 1.5 per cent of the sum of all the rest; this is one exception to the rules described above for methods of projection. The 1980 estimate is first made by projecting 1978 components at estimated growth rates, and then globally scaled to fit the control total £2400 m., which is shown in column (4) and is $(1.03)^2$ times the 1978 level of GDP. The method for 1985 is similar. The recent government policy of reduced current expenditure is apparent.

TABLE A2.2: IRISH GDP COMPONENTS PROJECTED TO 1980 AND 1985, AT 1970 PRICES

GDP component	1978 GDP £ million	Assumed ratio of 1980 to 1978	1980 GDP projection (1) x (2)		Assumed ratio of 1985 to 1980	Unscaled 1985 GDP projections (3) x (5) £ million	1985 revised GDP projections, scaled to match total £ million
			before scaling	after scaling			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Personal expenditure	1474	1.06	1562	1539	1.18	1843	1668
Govt. current expend.	373	1.02	380	374	1.06	403	365
Gross fixed cap. form.	532	1.07	569	561	1.21	688	623
Changes in stocks	7		57	56	1.17	67	60
Exports	1114	1.16	1292	1273	1.48	1912	1730
less Imports	-1238	1.15	-1424	-1403	1.45	-2065	-1869
GDP Total	2262		2436	2400		2848	2577

Housebuilding projections

Housebuilding is a part of Gross Fixed Capital Formation. At 1970 prices and in £ million, housebuilding had values 62 for 1969, 111.0 for 1974, and 102 for 1976. Thus the growth rate from 1969 to 1974 was 80 per cent, most unlikely to be repeated during 1981-85, because it is so high. The 1977 value was 100 units at 1970 prices. Later estimates are not known. This author decided to take no increase between 1977 and 1980, thus giving £100 million for 1980 and 25 per cent between 1980 and 1985, thus giving £125 million for 1985. These three values appear above as row 18. of T30, which is Table 6.

RAS Multipliers for 1980 and 1985

Table A2.3 shows the r_i and s_j multipliers used to estimate the 1980 and 1985 A-matrices, by applying them once and twice to the 1974 A-matrix. These multipliers are modifications of the actual multipliers derived from fitting 1974 aggregates to the existing 1969 base A-matrix, by RAS. Appendix Seven shows data for borders of the 1974 A-matrix.

TABLE A2.3 RAS MULTIPLIERS FOR PROJECTIONS OF IRISH 1974 A-MATRIX USED FOR 1980 and 1985

EXPLOR Sector	r_i	s_j
01. ag/for/fish	1.00	1.03
02. meat etc.	0.90	1.00
03. dairy	0.90	0.96
04. other food	0.80	1.15
05. drinks	1.10	0.80
06. tobacco	1.00	1.00
07. coal + peat	0.80	1.05
08. coke	-	-
09. petroleum	1.00	0.90
10. electricity	1.35	1.00
11. townsgas	1.35	0.85
12. radio active	-	-
13. water	1.00	1.00
14. ferrous	1.30	0.90
15. non ferrous	1.20	0.90
16. metal prods.	0.95	0.90
17. build. mats.	1.30	0.95
18. construction	0.95	0.95
19. chemicals	0.90	1.05
20. text. + cloth.	0.80	0.98
21. leath. + footw.	1.30	0.80
22. wood + furn.	0.90	1.01
23. paper + print.	1.00	0.90
24. plast. + rubber	1.05	1.05
25. other manufac.	0.90	1.00
26. ag + ind. mach.	0.98	1.02
27. office etc. mach.	1.30	0.80
28. electr. goods	0.80	1.03
29. motor vehs.	1.20	0.80
30. other transp. equip.	1.05	0.80
31. inland transp.	1.30	0.90
32. mar/air/aux.	1.20	0.90
33. communic.	1.30	0.80
34. distribution	0.95	0.80
35. services	1.25	0.80

APPENDIX THREE: SOURCE DATE OF T 69 and T 5

Table A3.1 following shows the Central Statistics Office (CSO) data relating to the 1969 R 44 input-output model, rearranged for the EXPLOR 35-sector system. The comments give details of the items being transferred.

TABLE A3.1: IRISH 1969 NEGATIVE PRODUCT TRANSFERS, FOR T 69

EXPLOR Producing sector	Product to be transferred £000 at 1969 prices (1)	Total input £000 at 1969 prices (2)	(1) as percent of (2), $x(-1)$ z^* (3)	Comments
01. Agriculture etc.	22 517	359 238	-6.268	86 Casuality hides +22431 cows, calves, skim
04. Other food	20	191 829	-0.010	20 factory line
05. Drinks	808	87 299	-0.925	39 carbon diox., 769 brewers' grains
11. Gas	468	4 700	-9.957	352 coke + 116 tar, oil etc.
21. Leather + footwear	754	25 613	-2.944	754 skin wool
24. Rubber + plastics	1 253	23 456	-5.342	869 rubber footwear + 384 plastic footwear
Total	25 820			

Table A3.2 shows the details of the product transfer matrix Z. This has the same six rows as Table A3.1 and spreads out the columns of that table in more detail. Each row transfers the product to its new sector; positive entries are the source and negative entries the destination. Percentages, shown in brackets in each row, add to zero for each row. Items are recognisable from their entries in the Comments section of Table A3.1.

TABLE A3.2: IRISH 1969 PRODUCT TRANSFER MATRIX Z, FOR T 5

EXPLOR Sector row	01. Ag. etc.	02. Meat	03. Dairy	04. Other food	05. Drinks	08. Coke	11. Towngas	19. Chemicals	21. Leather + footwear	24. Plastics + rubber
01. Ag. etc.	22 517 (100.000)	-86 (-0.382)	-22431 (-99.618)							
04. Other food				20 (100.000)				-20 (-100.000)		
05. Drinks				-769 (-95.173)	808 (100.000)			-39 (-4.827)		
11. Gas						-352 (-75.214)	468 (100.000)	-116 (-24.786)		
21. Leather	-754 (-100.000)								754 (100.000)	
24. Rubber									-1 253 (-100.000)	1 253 (100.000)

APPENDIX FOUR: SOURCE DATE OF TABLE 17

Table A4.1 shows the 1969 CSO R 44 data sources used to derive percentages for indirect taxes and subsidies, as proportion of gross output, after re-arranging as EXPLOR 35-sector figures.

TABLE A4.1: IRISH 1969 DATA FOR TAX AND SUBSIDY COEFFICIENTS

EXPLOR Sector	1969 Taxes linked to production £ mill. (1)	1969 Unalloc-ated taxes £ mill. (2)	1969 Subsidies linked + unalloc. £ mill. (3)	Total input 1969 £ mill. (4)	T 42 Ad valorem indir. tax rates (1) / (4) (5) %	T 43 Specific volum. tax rates (2) / (4) (6) %	T 45 Ad valorem subsidy rates (3) / (4) (7) %
01. Ag., for. fish.	0.273	10.998	28.392	359.238	0.076	3.061	7.903
02. Meat	2.109	0.733	3.751	148.409	1.421	0.494	2.527
03. Dairy	0.445	0.264	10.749	47.425	0.938	0.557	22.665
04. Other food	2.992	0.932	0.367	191.829	1.560	0.486	0.191
05. Drinks	48.185	0.308	0.122	87.299	55.195	0.353	0.140
06. Tobacco	49.693	0.136	0.053	71.811	69.200	0.189	0.074
07. Coal + Peat	0.243	0.004	0.002	16.186	1.501	0.025	0.012
08. Coke (c)				0.009	2.149	0.106	0.043
09. Petrol	37.560	0.025	0.010	60.453	62.131	0.041	0.017
10. Electricity (a)	0.876	0.044	0.020	40.765	2.149	0.108	0.049
11. Towngas (a)	0.101	0.005	0.002	4.700	2.149	0.106	0.043
13. Water (a)	0.069	0.003	0.001	3.223	2.141	0.093	0.031
14. Ferrous met. (b)	0.150	0.075	0.023	6.235	2.406	1.203	0.369
15. Non-ferrous (b)	0.495	0.263	0.082	20.500	2.415	1.283	0.400
16. Metal prods.	1.821	0.258	0.100	38.645	4.712	0.668	0.259
17. Build. Mats.	0.626	0.478	0.177	64.976	0.963	0.736	0.272
18. Construction	nil	0.503	0.224	220.891	0.000	0.228	0.101
19. Chemicals	2.477	0.408	6.052	54.881	4.513	0.743	11.027
20. Text. + cloth.	3.548	0.992	0.389	121.273	2.926	0.818	0.321
21. Leather + footwear	0.744	0.208	0.082	25.613	2.905	0.812	0.320
22. Wood + furn.	3.469	0.254	0.099	29.922	11.593	0.849	0.331
23. Paper + print.	2.884	0.383	0.149	56.074	5.143	0.612	0.266
24. Plastics + rubber	2.628	0.092	0.037	23.456	11.204	0.392	0.158
25. Other manufactures	1.055	0.049	0.019	9.614	10.974	0.510	0.198
26. Ag. + ind. mach.	0.112	0.093	0.037	14.939	0.750	0.623	0.248
27. Office etc. mach.	0.310	0.151	0.059	9.912	3.128	1.523	0.595
28. Electrical goods	4.570	0.341	0.134	45.986	9.938	0.742	0.291
29. Motor vehs.	4.412	0.321	0.128	51.298	8.601	0.626	0.250
30. Other trans. equip.	nil	0.071	0.099	13.849	0.000	0.513	0.715
31. Inland transport	nil	0.830	4.438	38.813	0.000	2.138	11.434
32. Marit., air, pux.	nil	0.342	nil	65.713	0.000	0.520	0.000
33. Communications	0.513	0.149	nil	30.730	1.669	0.485	0.000
34. Distrib.	nil	4.744	nil	194.668	0.000	2.437	0.000
35. Services	3.407	38.642	13.206	534.555	0.637	7.229	2.470
Total	175.767	63.099	69.003	2703.890			

(a) Pro rata gross output (total I/O thus subdivided)

(b) As for (1)

(c) Towngas rates used for coke

APPENDIX FIVE: SOURCE DATA OF T 72

In order to obtain labour/output coefficients for 1974 and project them to 1980 and 1985, several data sources were required. The following list covers the main sources, all of which relate to 1974 or earlier.

Employment Sources:

(1) Census of Population 1966, Volume III, compiled by Central Statistics Office, published by Stationery Office, Dublin, 1971. Table A 5.3 is an extract.

(2) Census of Population 1971, Volume III, compiled by Central Statistics Office and published by Stationery Office, Dublin 1971. Table A.5.4 is an extract.

(3) The Trend of Employment and Unemployment in 1975 compiled by Central Statistics Office and published by Stationery Office, Dublin 1977. This gave group totals for 1974 employment.

(4) Henry, E.W. Input-Output Studies of the Irish Economy and their Application to Model-Building, Medium-Term. Unpublished Ph.D. Dissertation, University College, Dublin, 1972. Appendix 18 discusses detailed 33-sector labour allocations for 1968.

(5) Irish Statistical Bulletin, Quarterly, compiled by Central Statistics Office and published by Stationery Office, Dublin. This has quarterly data on volume of output and employment, in each of about 50 manufacturing and mining industries. It also gives weekly and hourly wage-rates at the same level of detail.

(6) Central Statistics Office, through Messrs. M. Lucey, J. Madden and J. Keogh, gave considerable supplementary information on sub-sectors of the published industry detail.

How to get sector outputs for 1974 at 1970 prices

The general method was to apply volume changes to the 1969 EXPLOR outputs derived from the CSO R 44 model. Here the 1974 4-quarter average volume index numbers as published in (5) were compared with corresponding 1969 volume index numbers, and a slight adjustment made to take account of 1969 required to be expressed at 1970 prices.

Table A 5.1 brings together 1969 and 1974 employment and output and shows how the labour/output coefficients are calculated for both years.

Projection of labour/output coefficients to 1980 and 1985

Table A 5.2 explains and shows the method used, which gives extremely tentative results. With manyears per unit output decreasing between 1969 and 1974 (due to increasing productivity), it is assumed that such decreases will generally continue, to 1980 and 1985. In some sectors the 1969-74 change is simply repeated to 1980 and again to 1985; in others half the 1969-74 decrease is taken. Some few sectors for 1985 (and marked (b)) have a different reduction between 1980 and 1985, this latter reduction the result of other information.

TABLE A 5.1: IRISH LABOUR/OUTPUT COEFFICIENTS FOR 1969 AND 1974, WITH LABOUR AND OUTPUT DETAIL

EXPLOR sector	1969 Employment in man years (1)	1969 Output at producers' prices £ million current (2)	1969 Labour/output coefficient (1)/(2) Man years per £1 million (3)	1974 Employment in man years (4)	1974 Output at producer prices £ million 1970 prices (5)	1974 Labour/output coefficient man years per £ million (4) / (5) (6)
01. Agric. for., fish.	292 300	359.238	813.667	249 500	426.609	584.845
02. Meat etc.	14 230	148.409	95.884	15 825	196.372	80.587
03. Dairy	6 760	47.425	142.541	8 725	64.972	134.289
04. Other food	27 496	191.829	143.336	25 975	212.261	122.373
05. Drinks	7 970	87.299	91.295	7 450	128.357	58.041
06. Tobacco	2 350	71.811	32.725	2 375	96.759	24.546
07. Coal and peat	11 161	16.186	689.547	9 400	15.193	618.706
08. Coke	nil	0.009	nil	nil	?	nil
09. Petrol	400	60.453	6.6167	400	67.430	5.9321
10. Electricity	8 305	40.765	203.729	8 655	54.944	157.524
11. Towngas	1 734	4.700	368.936	1 705	6.154	277.056
12. Radio-active	nil	nil	-	nil	nil	-
13. Water	1 491	3.223	462.612	1 720	use 1969 level	462.612
14. Ferrous metals	1 486	6.235	238.332	2 100	9.661	217.369
15. Non-ferrous	1 220	20.500	59.512	1 725	24.436	70.593
16. Metal prods.	10 744	38.645	278.018	12 875	47.456	271.304
17. Building mats.	12 960	64.976	199.458	16 025	99.637	160.834
18. Construction	84 000	220.891	380.278	88 000	288.679	304.837
19. Chemicals	7 735	54.881	140.941	9 700	82.057	118.211
20. Textiles + clothing	44 280	121.273	365.127	37 925	161.554	234.751
21. Leather + footwear	8 540	25.613	333.424	6 800	23.188	293.255
22. Wood + furniture	8 002	29.922	267.429	8 475	34.308	247.027
23. Paper + printing	15 990	56.074	285.159	16 800	64.274	261.381
24. Plastics + rubber	4 900	23.456	208.902	6 671	30.602	217.992
25. Other manufactures	2 870	9.614	298.523	4 506	16.771	268.678
26. Ag. + indus. mach.	2 860	14.939	191.445	4 300	22.050	195.011
27. Office etc. mach.	1 910	9.912	192.696	2 648	17.713	149.495
28. Electrical goods	10 390	45.986	225.938	12 025	56.599	212.496
29. Motor vehicles	7 190	51.298	140.161	8 000	51.664	154.847
30. Other transp. equip.	5 090	13.849	367.536	5 875	18.232	322.236
31. Inland transport	20 441	38.813	526.653	20 601	46.823	439.948
32. Mar., air., aux. transp.	12 559	65.713	191.119	13 859	73.300	189.072
33. Communications	17 300	30.730	562.968	18 800	38.277	491.157
34. Distribution	176 042	194.668	904.319	176 000	242.479	725.836
35. Services	235 294	534.555	440.168	260 560	618.608	421.204
Total	1 066 000	2 703.890		1 066 000		

TABLE A 5.2: IRISH LABOUR/OUTPUT COEFFICIENTS FOR 1980 AND 1985, DERIVED FROM THOSE OF 1969 AND 1974 (Manyears per £ million)

EXPLOR Sector	L/O coefficient for 1969 (1)	L/O coefficient for 1974 (2)	Changes 1969-74 (1) less (2) (3)	T 72 for 1980; take (2) less (3) generally (4)	T 72 for 1985 take (4) less (3) generally (5)
01. Ag. for., fish	813.67	584.85	228.82	(b) 440.00	(b) 300.00
02. Meat etc.	95.88	80.59	15.29	65.30	50.01
03. Dairy	142.54	134.29	8.25	126.04	117.79
04. Other food	143.34	122.37	20.97	101.40	80.43
05. Drinks	91.30	58.04	33.26	(a) 41.41	(b) 35.00
06. Tobacco	32.73	24.55	8.18	16.37	(b) 15.00
07. Coal + peat	689.55	618.71	70.84	(b) 510.00	(b) 400.00
08. Coke	nil	nil	nil	nil	nil
09. Petrol	6.617	5.932	0.685	5.247	4.562
10. Electric.	203.73	157.52	46.21	111.31	(b) 100.00
11. Towngas	368.94	277.06	91.88	185.18	(b) 160.00
12. Radio-active	nil	nil			nil
13. Water	462.61	462.61	nil	462.61	462.61
14. Ferrous metals	238.33	217.37	20.96	196.41	175.45
15. Non-ferrous	59.51	70.59	take nil	70.59	70.59
16. Metal prods.	278.02	271.30	6.72	264.58	257.86
17. Building mats.	199.46	160.83	38.63	122.20	(b) 100.00
18. Construction	380.28	304.84	75.44	229.40	(b) 190.00
19. Chemicals	140.94	118.21	22.73	95.48	72.75
20. Text. + clothing	365.13	234.75	130.38	(a) 169.56	(b) 150.00
21. Leather + footwear	333.42	293.26	40.16	253.10	212.94
22. Wood + furn.	267.43	247.03	20.40	226.63	206.23
23. Paper + print,	285.16	261.38	23.78	237.60	213.82
24. Plastics + rubber	208.90	217.99	take nil	217.99	217.99
25. Other manufactures	298.52	268.68	29.84	238.84	209.00
26. Ag. + ind. mach,	191.45	195.01	take nil	195.01	195.01
27. Office etc. mach.	192.70	149.50	43.20	106.30	106.30
28. Electr. goods	225.94	212.50	13.44	199.06	185.62
29. motor veh.	140.16	154.85	take nil	154.85	154.85
30. Other transp. equip.	367.54	322.24	45.30	276.94	231.64
31. Inland transp.	526.65	439.95	86.70	(b) 330.00	(b) 220.00
32. Mar., air., aux.	191.12	189.07	2.05	(b) 175.00	(b) 160.00
33. Communications	562.97	491.16	71.81	(b) 400.00	(b) 280.00
34. Distribution	904.32	725.84	178.48	547.36	(b) 350.00
35. Services	440.17	421.20	18.97	(b) 360.00	(b) 299.31

(a) Use half the rate of reduction between 1969 and 1974.

(b) Estimate made by guesswork, where normal rules give coefficient much too small, or much too big, according to other information.

TABLE A 5.3 : IRISH 1966 CENSUS OF POPULATION VOLUME III:

TABLE 10A:- PERSONS CLASSIFIED BY INDUSTRIAL GROUP AND BY EMPLOYMENT STATUS.

Industrial group	Total gainfully occupied	Employers	Own account workers	Assisting relatives	Employees (excl. apprentices and learners)	Apprentices and learners	Total at work	Out of work
AGRICULTURE	341,005	11,515	190,193	83,260	46,180	11	331,159	9,846
FISHING	2,538	99	974	95	1,200	-	2,368	170
MINING, QUARRYING AND TURF PRODUCTION	10,208	42	94	16	8,863	290	9,305	903
MANUFACTURING INDUSTRIES	207,168	1,324	7,456	636	181,220	7,741	198,377	8,791
Food	40,983	169	145	104	37,029	788	38,235	2,748
Beverages	9,961	8	-	4	9,462	104	9,578	383
Tobacco	2,233	-	-	-	2,198	7	2,205	28
Textiles and textile made-up goods	23,685	28	122	14	22,542	235	22,941	744
Clothing	28,626	285	2,334	132	23,724	1,194	27,669	957
Leather and leather substitute products	2,679	18	161	8	2,338	36	2,561	118
Wood and cork	6,602	170	2,127	107	3,344	545	6,293	309
Furniture	5,956	168	327	42	4,405	745	5,687	269
Paper and paper products	4,845	-	-	-	4,518	90	4,608	237
Printing and publishing	12,403	104	154	14	10,962	945	12,179	224
Rubber products	3,062	9	-	-	2,967	26	3,002	60
Chemicals and chemical products	9,796	4	5	-	9,340	75	9,424	372
Bricks, pottery, stone and glass	9,647	75	236	24	8,537	375	9,247	400
Metal products	13,697	106	1,278	128	10,791	741	13,044	653
Machinery (excl. electrical machinery)	4,988	40	100	11	4,181	479	4,811	177
Electrical machinery and appliances	9,301	4	74	3	8,603	268	8,952	349
Transport equipment	11,836	56	91	18	10,459	767	11,391	445
Other manufacturing industries	6,868	80	302	27	5,820	321	6,550	318
BUILDING AND CONSTRUCTION	87,002	2,412	5,505	540	60,583	5,100	74,140	12,862
ELECTRICITY, GAS AND WATER SUPPLY	12,475	-	-	-	11,159	752	11,911	564
COMMERCE	155,495	8,065	27,453	5,559	102,544	6,517	150,138	5,357
INSURANCE, BANKING AND FINANCE	16,141	124	183	17	15,681	1	16,006	135
TRANSPORT, COMMUNICATION AND STORAGE	60,074	503	4,067	273	51,882	521	57,246	2,828
PUBLIC ADMINISTRATION AND DEFENCE	44,453	-	-	-	42,951	238	43,189	1,264
PROFESSIONS	95,191	1,300	4,464	42	83,110	4,858	93,774	1,417
PERSONAL SERVICE	67,043	1,691	4,271	700	54,477	1,958	63,097	3,946
ENTERTAINMENT AND SPORT	11,752	238	730	70	9,927	188	11,153	599
OTHER INDUSTRIES OR INDUSTRY NOT STATED	7,659	1	78	4	3,963	78	4,124	3,535
TOTAL ALL INDUSTRIES	1,118,204	27,314	245,468	91,212	673,740	28,253	1,065,987	52,217

TABLE A 5.4: IRISH 1971 CENSUS OF POPULATION VOLUME III:

TABLE 10A:- PERSONS CLASSIFIED BY INDUSTRIAL GROUP AND BY EMPLOYMENT STATUS.

Industrial group	Total gainfully occupied	Employers and own account workers	Assisting relatives	Employees	Total at work	Out of work
AGRICULTURE, FORESTRY AND FISHING	284,565	184,403	53,134	35,542	273,079	11,486
MINING, QUARRYING AND TURF PRODUCTION	11,523	104	5	10,311	10,420	1,103
MANUFACTURING INDUSTRIES	225,759	8,718	434	204,481	213,633	12,126
Food, beverages and tobacco	55,019	428	53	50,654	51,135	3,884
Textiles, clothing, footwear and leather	57,117	2,345	83	51,960	54,388	2,729
Wood and wood products	13,065	2,855	119	9,179	12,153	912
Paper, paper products, printing and publishing	17,832	372	31	16,968	17,371	461
Chemical, rubber and plastic products	15,831	34	1	15,204	15,239	592
Glass, pottery and cement	12,111	379	37	11,151	11,567	544
Metals, metal products and machinery	33,521	1,682	86	29,988	31,756	1,765
Transport equipment	13,040	192	10	12,151	12,353	687
Other manufacturing industries	8,223	431	14	7,226	7,671	552
BUILDING AND CONSTRUCTION	100,039	11,396	588	72,549	84,533	15,506
ELECTRICITY, GAS AND WATER SUPPLY	14,757	-	-	14,163	14,163	594
COMMERCE	154,616	34,241	3,868	110,177	148,286	6,330
INSURANCE, FINANCE AND BUSINESS SERVICES	24,319	1,276	30	22,686	23,992	327
TRANSPORT, COMMUNICATION AND STORAGE	63,542	5,509	197	54,416	60,122	3,420
PUBLIC ADMINISTRATION AND DEFENCE	50,051	-	-	48,869	48,869	1,182
PROFESSIONAL SERVICES	110,841	6,197	35	102,846	109,078	1,763
PERSONAL SERVICES	58,989	5,678	540	48,223	54,441	4,548
RECREATIONAL SERVICES	11,591	1,196	68	9,587	10,851	740
OTHER INDUSTRIES OR INDUSTRY NOT STATED	8,939	185	14	3,173	3,372	5,567
TOTAL ALL INDUSTRIES	1,119,531	268,903	58,913	737,023	1,054,839	64,692

APPENDIX SIX: SOURCE DATA OF T 49

For estimation of the wage and salary income per employee manyear, the 1969 EXPLOR 35-sector model is the first data source. Employee compensation is thus available for paid employees in 1969. The numbers of such employees in 1969 are estimated from the source data referred to in Appendix Five. As shown in the first three columns of Table A6.1, this enables 1969 payment per employee to be obtained. Changes in weekly wage-rates between 1969 and 1974 were calculated from 4-quarter averages for 1969 and 1974, as published in the Irish Statistical Bulletin, and from other CSO sources, some unpublished. Column (4) of Table A6.1 shows the resulting inflators, which have been applied to column (3) to give column (5) results which relate to 1974.

To get estimates of wage rates for 1980 and 1985, we apply (in succession) estimated inflators to 1974 and 1980 estimates. The chosen inflator for 1974-80 is roughly the same in each sector as it was for 1969-74; a slightly lower rate is assumed to apply for 1980-85.

It is important to notice that the chosen inflators include allowance for productivity increases since 1970, as well as allowance for price inflation. An alternative method would be to apply the consumer price index (based on 1.0 for 1970) to the 1970 wage per manyear and scale up the result in line with productivity increase as shown by Table A5.2 column (1) entry $\frac{4}{5}$ column (5) entry, for 1985.

TABLE A 6.1 IRISH WAGES AND SALARIES PER PAID EMPLOYEE MAN-YEAR, 1969, 1974, 1980 and 1985

EXPLOR sector	1969 Employee Compens. £ thousand (1)	1969 Number of paid employ thousand (2)	£ per Man Year 1969 (1)/(2) (3)	Weekly Wage Inflator 1974 based on 1.0 for 1960 (4)	Estimated £ per Man Year for 1974 (3) x (4) (5)	Chosen Inflator 1974-80 (6)	£ per man year 1980 (5) x (6) (7)	Chosen Inflator for 1980-85 (8)	£ per man year 1985 (7) x (8) (9)
01. Ag., for., fish.	22 970	40.300	569.975	1·7	969·00	2·83	2741	1.9	5 208
02. Meat	7 355	8.330	882.953	2.416	2133.21	2.4	5119	2.05	10 494
03. Dairy	6 530	6.760	959.976	2.320	2227.14	2.3	5122	2.0	10 244
04. Other food	23 282	27.496	846.014	2.169	1835.00	2.2	4037	1.9	7 670
05. Drinks	9 868	7.970	1238.143	2.310	2860.11	2.3	6578	2.0	13 156
06. Tobacco	2 603	2.350	1107.660	2.289	2535.43	2.3	5831	2.0	11 662
07. Coal + peat	5 718	5.461	1047.061	2.056	2152.76	2.1	4521	1.8	8 138
09. Petrol	524	0.400	1310.000	2.291	3001.21	2.3	6902	2.0	13 804
10. Electricity	13 826	11.305	1222.999	2.228	2724.84	2.2	5995	1.9	11 390
11. Towngas	1 880	1.734	1084.198	direct	2200.78	2.0	4402	1.75	7 704
13. Water	1 210	1.491	811.535	2.181	1769.96	2.2	3894	1.9	7 399
14. Ferrous met.	1 441	1.486	969.717	2.086	2022.83	2.1	4248	1.8	7 646
15. Non-ferrous	1 717	1.220	1407.377	2.098	2952.68	2.1	6201	1.8	11 162
16. Metal prods.	10 420	10.744	968.844	2.086	2021.01	2.1	4244	1.8	7 639
17. Building mats.	13 309	12.960	1026.929	2.146	2203.79	2.1	4628	1.8	8 330
18. Construction	58 636	61.474	953.834	2.028	1934.38	2.0	3868	1.75	6 769
19. Chemicals	7 881	7.735	1018.875	2.352	2396.39	2.4	5750	2.05	11 787
20. Textiles + cloth.	28 806	44.280	650.542	2.259	1469.57	2.3	3381	2.0	6 762
21. Leather + footwear	6 219	8.540	728.220	2.011	1464.45	2.0	2928	1.75	5 124
22. Wood + furn.	5 919	8.002	739.690	2.127	1573.32	2.1	3303	1.8	5 945
23. Paper + print +	16 283	15.990	1018.324	2.081	2119.13	2.1	4450	1.8	8 010
24. Plastics + rubber	4 398	4.900	897.551	2.359	2117.32	2.4	5081	2.05	10 416
25. Other manuf.	2 412	2.870	840.418	2.291	1925.40	2.3	4428	2.0	8 856
26. Ag. + indus. mach.	2 711	2.860	947.902	1.932	1831.35	2.0	3662	1.75	6 409
27. Office etc. mach.	1 714	1.910	897.382	2.018	1810.92	2.0	3622	1.75	6 339
28. Elect. goods	8 904	10.390	770.356	2.018	1554.58	2.0	3110	1.75	5 443
29. Motor Veh.	8 113	7.190	1128.373	1.943	2192.43	2.0	4384	1.75	7 672
30. Other trans. equip.	5 534	5.090	1097.053	2.192	2404.74	2.2	5291	1.9	10 053
31. Inland transp.	20 008	14.735	1357.855	2.099	2850.14	2.1	5985	1.8	10 773
32. Mar., air, aux.	21 581	12.559	1718.369	2.213	3802.75	2.2	8367	1.9	15 897
33. Communications	15 017	17.300	868.035	2.035	1766.45	2.0	3532	1.75	6 181
34. Distribution	77 792	137.933	563.984	2.035	1147.71	2.0	2296	1.75	4 018
35. Services	252 761	220.274	1147.484	2.196	2519.87	2.2	5544	1.9	10 534

APPENDIX SEVEN: SOURCE DATA FOR 1974, SHOWING PRIMARY INPUTS, FINAL DEMANDS, AND HOW COLUMN AND ROW TOTALS WERE OBTAINED FOR THE A-MATRIX

This appendix has four tables. The first shows the primary input estimates and derivation of control totals for the columns of the 1974 inter-industry transactions. The other three show how final demands at purchaser prices have Trade margins deducted, so as to permit estimation of control totals for inter-industry 1974 transaction rows. All values are at 1970 prices.

TABLE A 7.1: IRISH 1974 PRIMARY INPUTS

(£ million at 1970 prices)

EXPLOR Sectors	Employee Compensat. (1)	Gross Profits (2)	Indirect Taxes (3)	less Subsidies (4)	(1)+(2)+(3)+(4) Total Primary (5)	Total Input (6)	Totals for inter-industry (6) less (5) (7)
01. agric.	25.300	248.300 ≠	17.781	-40.827	250.554	426.609	176.055
02. meat	14.672	4.374	4.709	- 6.007	17.748	196.372	178.624
03. dairy	13.486	1.829	1.228	-17.828	-1.285	64.972	66.257
04. other food	38.803	6.824	5.428	- 0.490	50.565	212.261	161.696
05. drinks	21.872	8.244	87.360	- 0.217	117.259	128.357	11.098
06. tobacco	5.287	3.190	68.388	- 0.087	76.778	96.759	19.981
07. coal + peat	8.091	3.589	0.284	- 0.002	11.962	15.193	3.231
08. coke	nil	nil	0.001	- 0.000	0.001	0.020	0.019
09. petrol	0.880	0.545	51.343	- 0.014	52.754	67.430	14.676
10. electricity	28.092	12.269	1.525	- 0.032	41.854	54.944	13.090
11. townsgas	3.711	0.446	0.171	- 0.003	4.325	6.154	1.829
12. radio-active					nil	nil	nil
13. water	2.717	0.136	0.132	- 0.002	2.983	4.800	1.817
14. ferrous	3.366	0.543	0.439	- 0.043	4.305	9.661	5.356
15. nonferrous	3.086	4.755	1.140	- 0.118	8.863	24.436	15.573
16. metal prod.	19.290	3.753	3.161	- 0.149	26.055	47.456	21.401
17. Build. Mat.	30.767	11.745	2.151	- 0.328	44.335	99.637	55.302
18. Construct	115.519	8.989	0.878	- 0.352	125.034	288.679	163.645
19. chemicals	17.764	11.407	5.347	-10.955	23.563	82.057	58.494
20. text. cloth	57.849	9.113	7.548	- 0.628	73.882	161.554	87.672
21. leath.+ footw.	8.487	1.192	1.076	- 0.089	10.666	23.188	12.522
22. wood + furn.	10.231	1.711	5.258	- 0.138	17.062	34.308	17.246
23. paper + print.	28.136	4.874	4.572	- 0.207	37.375	64.274	26.899
24. plastics	8.650	1.994	4.359	- 0.058	14.945	30.602	15.657
25. other man.	6.346	0.924	2.368	- 0.040	9.598	16.771	7.173
26. agr + ind.M.	6.031	1.641	0.385	- 0.066	7.991	22.050	14.059
27. office-mach.	4.617	2.924	1.038	- 0.128	8.451	17.713	9.262
28. elctr. goods	14.850	4.617	7.447	- 0.199	26.715	56.599	29.884
29. motor veh.	12.318	1.892	5.872	- 0.157	19.925	51.664	31.739
30. other tr. eq.	11.082	0.580	0.125	- 0.158	11.629	18.232	6.603
31. inland transp.	28.850	8.538	1.333	- 6.482	32.239	46.823	14.584
32. mar/air/aux.	28.774	10.975	0.507	nil	40.256	73.300	33.044
33. communic.	22.357	8.332	1.030	nil	31.719	38.277	6.558
34. distrib.	115.819	67.655	7.866	nil	191.340	242.479	51.139
35. services	356.800	151.600	64.350	-18.496	554.254	618.608	64.354
TOTAL	1 073.900	609.500	366.600	-104.300	1945.700	3342.239	1396.539

≠ Most agricultural workers are self-employed. For sector 01. having 249 500 manyears at say roughly £700 per manyear, the 1974 equivalent of "employee compensation" is £175 million. But the £248.3 m. is treated as "Profits" by the National Accounts.

TABLE A7.2: IRISH 1974 FINAL DEMANDS AT PURCHASER PRICES (£million at 1970 prices)

EXPLOR Sectors	Household Consumption Expenditure	Govt. Current Expend.	Gross Fixed Capital Formation	Stock Increases	Exports of Goods and Services	TOTAL FINAL DEMAND (A)
01. Ag./for/fish	81.100	0.489	4.904	-5.000	69.880	151.373
02. meat	89.000			2.100	105.850	196.950
03. dairy	29.600			1.400	22.300	53.300
04. other food	134.300			2.700	62.260	199.260
05. drinks	150.000			0.600	11.200	161.800
06. tobacco	96.219			4.000	8.310	108.529
07. coal + peat	13.903				1.730	15.633
08. coke	0.100				0.150	0.250
09. petrol	62.378			0.900	2.520	65.798
10. electric.	31.900					31.900
11. townsgas	4.800					4.800
12. radio-active		0.01≠				
13. water	3.900					3.900
14. ferrous	1.100			1.900	5.840	8.840
15. non-ferrous	0.800			1.300	18.650	20.750
16. metal goods	22.500		25.275	2.300	28.740	78.815
17. build. mats.	0.600		1.037	2.700	19.720	24.057
18. construct.	nil	19.249	243.076*			262.325
19. chemicals	39.300			5.000	66.190	110.490
20. text. + cloths.	148.600		3.567	5.000	95.900	253.067
21. leather + footw.	23.000		0.030	2.000	13.980	39.010
22. wood + furn.	24.400		4.231	1.700	3.320	33.651
23. paper + print.	36.000		0.006	4.100	18.060	58.166
24. plast. + rubber	23.900		1.720	3.500	16.730	45.850
25. other manu.	19.200		1.906	0.600	7.400	29.106
26. ag. + ind. mach.	4.400		80.605	2.700	20.920	108.625
27. office mach.	3.400		22.944	0.700	16.010	43.054
28. electr. goods	34.000		19.573	2.100	48.540	104.213
29. motor veh.	40.900		39.850	5.400	4.00	90.150
30. other transp.	2.100		11.541	0.800	nil	14.441
31. inland transp.	14.700				2.130	16.830
32. mar/air/aux.	6.300				48.190	54.490
33. communic.	8.000				0.870	8.870
34. distribution	nil					nil
35. services	157.600	300.362			13.410	471.372
TOTAL	1 308.000	320.100	460.265	48.500	732.800	2 869.665

* includes dwellings 111.000

≠ Dummy entry, for computing purposes, to permit small non-zero sector 12. output.

TABLE A7.3: ESTIMATIONS OF IRISH 1974 TOTAL FINAL DEMANDS AT PRODUCER PRICES

(£ million at 1970 prices, except for column (1))

EXPLOR Sectors	Trade margin on Final Output 1969 at 1969 prices (1) £ million	Column (1) scaled * up to give for 1974 at 1970 prices (2) £ million	1974 Total Final Demand (A) at 1970 purchaser prices (3) £ million	(3) less (2): 1974 Total Final Demand at 1970 PRODUCER prices (B) (4) £ million
01. ag/for/fish.	14.1	17.6	151.373	133.773
02. meat	4.7	5.9	196.950	191.050
03. dairy	2.4	3.0	53.300	50.300
04. other food	16.8	20.9	199.260	178.360
05. drinks	26.5	32.0	161.800	129.800
06. tobacco	6.9	9.6	108.529	98.929
07. coal + peat	1.4	1.7	15.633	13.933
08. coke	0.1	0.1	0.250	0.150
09. petrol	3.7	4.6	65.798	61.198
10. electric.	nil	nil	31.900	31.900
11. townsgas	nil	nil	4.800	4.800
12.				
13. water	nil	nil	3.900	3.900
14. ferrous	0.3	0.4	8.840	8.440
15. non-ferrous	0.7	0.9	20.750	19.850
16. metal goods	5.3	6.6	78.815	72.215
17. build. mats.	2.3	2.9	24.057	21.157
18. construct.	nil	nil	262.325	262.325
19. chemicals	3.7	4.6	110.490	105.890
20. text. + cloth .	19.5	24.2	253.067	228.867
21. leather + footw.	3.7	4.6	39.010	34.410
22. wood + furn.	3.4	4.2	33.651	29.451
23. paper + print.	4.8	6.0	58.166	52.166
24. plastic.+ rubber	3.2	4.0	45.850	41.850
25. other manuf.	2.9	3.6	29.106	25.506
26. ag. + ind. mach.	6.8	8.5	108.625	100.125
27. office mach.	2.3	2.9	43.054	40.154
28. elect. goods	6.7	8.3	104.213	95.913
29. motor veh.	11.3	14.1	90.150	76.050
30. other transp.	0.3	0.4	14.441	14.041
31. inland transp.			16.830	16.830
32. mar/air/aux			54.490	54.490
33. communic.			8.870	8.870
34. distribut.		(-191.6)	nil	191.600
35. services			471.372	471.372
TOTAL	153.8	191.6 (0.0)	2 869.665	2 869.665

* scaling factor is 1.245505 given by 242.5/194.7, which is the output of wholesale and retail trade 1974 at 1970 prices divided by same for 1969 at 1969 prices.

TABLE A7.4: ESTIMATION OF IRISH 1974 INTER-INDUSTRY ROW AGGREGATES AT PRODUCER PRICES (£ million at 1970 prices)

EXPLOR Sectors	Gross outputs of domestic sectors at producer prices (1)	Imports (2)	Total flow (1) + (2) (3)	Aggregate Final Demand at producer prices (B) (4)	Row control totals for inter-industry (3) less (4) (5)
01. Ag. for.fish.	426.609	70.455	497.064	133.773	363.291
02. meat	196.372	2.420	198.792	191.050	7.742
03. dairy	64.972	1.550	66.522	50.300	16.222
04. other food	212.261	39.930	252.191	178.360	73.831
05. drinks	128.357	6.130	134.487	129.800	4.687
06. tobacco	96.759	2.200	98.959	98.929	0.030
07. coal + peat	15.193	7.240	22.433	13.933	8.500
08. coke	0.020	0.160	0.180	0.150	0.030
09. petrol	67.430	50.610	118.040	61.198	56.842
10. electricity	54.944	-	54.944	31.900	23.044
11. townsgas	6.154	-	6.154	4.800	1.354
13. water	4.800	-	4.800	3.900	0.900
14. ferrous	9.661	37.530	47.191	8.440	38.751
15. non-ferrous	24.436	14.960	39.396	19.850	19.546
16. metal goods	47.456	54.810	102.266	72.215	30.051
17. build. mats.	99.637	16.250	115.887	21.157	94.730
18. Construct.	288.679	-	288.679	262.325	26.354
19. chemicals	82.057	100.730	182.787	105.890	76.897
20. text. + cloth.	161.554	112.340	273.894	228.867	45.027
21. leath. + footw.	23.188	21.360	44.548	34.410	10.138
22. wood + furniture	34.308	19.610	53.918	29.451	24.467
23. paper + print.	64.274	37.660	101.934	52.166	49.768
24. plast. + rubber	30.602	30.330	60.932	41.850	19.082
25. other manu.	16.771	29.270	46.041	25.506	20.535
26. ag. + ind. mach.	22.050	105.360	127.410	100.125	27.285
27. office mach.	17.713	29.970	47.693	40.154	7.529
28. elect. goods	56.599	60.520	117.119	95.913	21.206
29. motor veh.	51.664	56.250	107.914	76.050	31.864
30. other transp. equip.	18.232	6.680	24.912	14.041	10.871
31. inland transport	46.823	-	46.823	16.830	29.993
32. mar/air/aux.	73.300	6.720	80.020	54.490	25.530
33. communic.	38.277	1.610	39.887	8.870	31.017
34. distribution	242.479	-	242.479	191.600	50.879
35. services	618.608	1.310	619.918	471.372	148.546
TOTAL	3 342.239	918.965	4266.204	2 869.665	1396.539

APPENDIX EIGHT : COMPUTED AND EXOGENOUS RESULTS COMPARED, FOR 1980 AND 1985

This appendix has two tables, one for 1980 and the other for 1985. The purpose of both tables is to validate the input data used for exports (T36), imports (T37), price indices of domestic production (T87), gross profits margins (T94), as given in the tables of this Report. These four sets of exogenous data are of their nature preliminary and subject to revision, until application of EXPLOR computations to all of the data for a year enables them to be revised. The revision process could be repeated.

The discussion which follows will explain how the input data are to be validated or amended. Table A8.1 for 1980 will suffice as topic, because 1985 entries in Table A8.2 are closely similar to those of 1980.

Sector Outputs and Exports and Imports

Comparison of columns (1) and (2) of Table A8.1 shows that the computed sector output is always greater than the corresponding export, thus making sense. This implies that: (i) the export vector T36 is acceptable, as detailed Table 10; (ii) the import vector T37 is acceptable, as detailed in Table 11.

Entries in Tables 10 and 11 are in fact revised figures; what can happen in first tests is that specified imports for some sectors are so large that the corresponding domestic sector output is smaller than specified exports. It is necessary to reduce the imports for these sectors, with compensatory increases in imports of other sectors, so as to keep a specified total value of imports. Several trials may be required, to reach a satisfactory outcome. Extreme excess of an import can give a negative sector output, which has no meaning; major reduction of the import is the solution of this problem.

TABLE A8.1: IRISH 1980 COMPUTED AND EXOGENOUS RESULTS: SECTOR OUTPUTS, EXPORTS, PRICE INDICES, PROFIT MARGINS

EXPLOR SECTORS	Sector Outputs, Computed	T36, Exports, Exogenous	Price Indices of Sector Outputs		Gross Profit Margins	
			Computed	T87, EXOGEN	Computed	T94, EXOGEN
	£million at 1970 prices		To base 1.0 for 1970		Per cent of Sector Output	
	(1)	(2)	(3)	(4)	(5)	(6)
1. Agric.	509.89	94.6	3.862	4.0	42.3	24.00
2. Meat	286.56	186.1	3.646	3.9	2.3	2.23
3. Dairy	109.10	50.0	4.389	4.1	2.7	2.82
4. Other food	287.65	125.5	3.627	3.7	3.3	3.22
5. Drinks	137.02	14.0	3.064	3.6	15.0	6.42
6. Tobacco	119.36	29.7	3.151	3.3	3.8	3.30
7. Coal/peat	18.19	2.0	4.365	4.2	21.1	23.62
8. Coke	0.64	0.2	3.368	3.4	(40.9)	0.0
9. Petrol	41.91	3.0	7.413	8.2	1.0	0.81
10. Electricity	75.80		5.151	5.5	63.3	22.33
11. Townsgas	7.44		2.194	5.6	10.9	7.25
12. Radio-active	0.01		4.000	4.0	(100.0)	0.0
13. Water	5.38		3.360	3.2	2.7	2.82
14. Ferrous Met.	41.00	12.3	3.216	3.2	5.7	5.63
15. Non-ferrous	48.68	25.8	3.517	3.4	16.4	19.46
16. Metal prods.	69.49	55.0	3.147	3.0	7.1	7.91
17. Build. Mat.	189.13	15.2	3.295	4.2	22.7	11.79
18. Construction	325.45		3.082	3.6	3.5	3.11
19. Chemicals	228.66	174.2	3.441	3.1	8.2	13.90
20. Text. and cloth.	203.81	154.1	2.457	2.9	6.9	5.64
21. Leather & Foot.	8.05	4.9	3.056	3.4	5.8	5.14
22. Wood & Furn.	19.77	4.3	3.283	3.8	6.0	4.99
23. Paper & Print	71.25	50.8	2.787	3.3	10.0	7.58
24. Plastics & Rubb.	22.54	4.3	3.363	3.6	7.6	6.52
25. Other man.	12.71	10.2	3.034	3.2	6.0	5.51
26. Ag. & Ind. Mach.	85.65	49.8	3.446	3.4	7.4	7.44
27. Office Mach.	61.96	52.5	2.980	3.4	28.2	16.51
28. Elect. Goods	74.04	55.9	3.160	3.4	9.6	8.16
29. Motor Veh.	52.26	12.3	2.652	3.1	4.3	3.66
30. Other trans.eq.	31.10		2.501	3.1	3.7	3.18
31. Inland transport	65.78	3.0	3.934	4.5	33.4	18.24
32. Mar., air, aux.	100.22	67.5	4.270	4.6	22.6	14.97
33. Communication	63.36	1.8	3.336	3.5	77.4	21.77
34. Distribution	254.64		3.495	3.5	39.9	27.90
35. Services	857.56	14.0	3.964	3.6	40.3	24.51
TOTAL	4486.06	1273.0				

TABLE A8.2: IRISH 1985 COMPUTED AND EXOGENOUS RESULTS: SECTOR OUTPUTS, EXPORTS, PRICE INDICES, PROFIT MARGINS

EXPLOR SECTORS	Sector Outputs, Computed	T36, Exports, EXOGEN	Price Indices of Sector Outputs		Gross Profit Margins	
			Computed	T87, EXOGEN	Computed	T94, EXOGEN
	£million at 1970 prices		To base 1.0 for 1970		Per cent of Sector Output	
	(1)	(2)	(3)	(4)	(5)	(6)
1. Agric.	589.16	128.5	5.818	6.4	45.2	24.00
2. Meat	370.80	252.9	5.464	6.0	2.3	2.23
3. Dairy	131.34	67.9	6.621	6.0	2.6	2.82
4. Other food	331.75	170.5	6.006	6.0	3.2	3.22
5. Drinks	160.84	19.0	4.715	5.5	14.8	6.42
6. Tobacco	140.37	40.4	4.754	4.8	3.4	3.30
7. Coal & Peat	18.44	2.7	6.369	6.0	15.6	23.62
8. Coke	0.58	0.2	4.967	5.0	(21.6)	0.0
9. Petrol	37.72	4.1	11.187	12.0	0.9	0.81
10. Electricity	108.23		7.863	9.0	63.7	22.33
11. Townsgas	9.22		3.165	9.0	10.7	7.25
12. Radio-active	0.01		5.500	5.5	(100.0)	0.0
13. Water	6.01		6.038	4.8	2.1	2.82
14. Ferrous Met.	66.28	16.7	5.142	5.0	4.9	5.63
15. Non-ferrous	65.89	35.0	5.298	5.0	8.7	19.46
16. Metal prods.	81.68	74.7	5.142	4.5	5.1	7.91
17. Build. Mats.	299.54	20.6	5.151	7.0	21.5	11.79
18. Construction	364.88		4.899	5.5	3.4	3.11
19. Chemicals	279.42	236.7	5.748	4.8	1.5	13.90
20. Text. & Cloth.	253.34	209.9	3.837	4.5	6.8	5.64
21. Leather & Foot.	13.87	6.6	4.124	5.0	6.2	5.14
22. Wood & Furn.	15.14	5.9	4.513	5.5	6.0	4.99
23. Paper & Print	79.38	69.1	4.201	5.0	9.9	7.58
24. Plastics & Rubb.	22.76	5.9	5.720	5.0	4.7	6.52
25. Other manuf.	19.06	13.8	4.903	5.0	5.7	5.51
26. Ag. & Ind. Mach.	76.95	67.7	5.815	5.0	4.7	7.44
27. Office Mach.	81.26	71.4	4.431	5.0	27.1	16.51
28. Elect. Goods	83.83	75.9	5.050	5.0	8.0	8.16
29. Motor Veh.	26.03	16.7	3.975	4.8	4.3	3.66
30. Other trans.eq.	35.24		3.689	4.8	3.7	3.18
31. Inland transport	88.00	4.1	5.705	7.5	41.9	18.24
32. Mar., air, aux.	137.30	91.7	6.963	7.5	21.5	14.97
33. Communication	89.07	2.4	4.953	5.5	47.5	21.77
34. Distribution	296.33		5.288	5.5	51.3	27.90
35. Services	961.96	19.0	5.724	5.5	36.6	24.51
TOTAL	5341.68	1730.0				

Price Indices and Gross Profit Margins

Price indices and gross profit margins are interlinked and therefore should be considered together. Column (4) of Table A8.1 shows sector price indices (base 1.0 for 1970) exogenously specified as applicable to 1980. Column (3) shows matched computed price indices, most of which are smaller than corresponding column (4) entries. The computed values are an improvement on those of column (4), because they are consistent with each other and with the computed gross profit margins of column (5).

These columns (5) computed values correspond to exogenously specified column (6) gross profit margins, and are better than them because they are consistent with each other and with column (3) computed prices. Two values are spurious and may be ignored; those for coke (sector 8) and radi-active (sector 12) both of which do not exist in Ireland. We find generally that computed profits are higher than exogenous column (6) values, in some sectors very much higher.

It is essential that the user understands how EXPLOR defines and calculates employee income and gross profits. Employee income is got by applying a T49 "wage per manyear" coefficient to total estimated employment for the sector. Gross profit is the residue, after employee income thus defined has been subtracted from total input at current prices, all other costs except depreciation having been also subtracted. Thus gross profit does not allow for self-employed persons; their income is necessarily included as employee income since they are numbered among the employment total. Gross profit therefore in principle includes depreciation cost and any further surplus permitted by prices and productivity. This means that the Irish National Accounts amount of Profits in Agriculture is mostly included in employee income for EXPLOR experiments; most Irish farmers are self-employed, their income for National Accounts being treated as "profits", but for EXPLOR purposes as wages and salaries.

The process of computation of entries in Table A8. 1 columns (3) and (5) is a least-squares error attempt to consistently match both price and profits exogenous values, as specified in columns (4) and (6), in correct accord with all data for 1980.

Interpretation of Computed Price and Profits Results

Column (3) and (5) computed results are fully consistent. This means that if we use them as EXOGENOUS, columns (4) and (6) respectively, we get back exactly the same computed values for columns (3) and (5).

Suppose we accept column (3) computed price indices as satisfactory, for 1980 market and economic conditions. Then column (5) profit margins necessarily follow. Where the computed margin is considerably larger than that specified, e. g. sector 1. agriculture computed value 42. 3 per cent compared with exogenous 24. 0 per cent, this suggests increased allocation possible to employee wages and salaries, either by direct increase of wage levels or by profit-sharing.

Where the computed margin is smaller than specified, e. g. sector 19. chemicals 8. 2 per cent versus 13. 9, then this suggests that employee wages and salaries need to be reduced, to bring up the available profit margin. Revision of T49 is required. The T49 specified values multiplied by computer printout of employment gives specified wages and salaries, valued at current prices, call this vector A. Likewise Table A8. 1 column (1) x col. (3) x col. (5) value gives computed gross profits margin at current prices, call this vector B. The vector A+B must be kept constant, so if B is increased, to increase profits, A must be correspondingly reduced in each sector, and T49 correspondingly reduced.

How to Change Exogenous Results to Get Satisfactory Solutions

Two problems will be briefly considered here:

(i) The first arises when a computed gross profit margin is negative. This might be because the sector has a large number of self-employed persons, with income by mistake assumed part of profits, and the paid employees earning more money on average than

these self-employed persons. Adjustment of T49 wage-rate for the sector is required, along the lines discussed above for profits too low.

But the negative profits may also arise from the price index of the sector, in T87, being set too low. Revision upward of the required amount can be approximated as follows: If the required profit margin is x% and the computed margin is -y%, increase the computed price index corresponding to T87 by (x+y)/100 times its previous value i.e. adjust Table A8.1 column (3) entry by this amount, and use as the next T87 corresponding value.

(ii) A more general problem is how to use the EXPLOR model to estimate domestic sector price inflation, for profit margin and wage-rates specified. This means in effect keeping T49 and T94 unchanged, but iteratively adjusting T87 (the exogenous price index) until this vector and the vector of computed price indices closely approximate each other. The end of the previous section suggests a method of adjustment of T87 elements. A required change of x% in the computed gross profit margin of a sector means making a change of x% to the previous value of the corresponding entry of column (3) and using the revised entry as the next T87 value.

As an example, consider Table A8.1 sector 1, agriculture. The computed profit is 42%, the required profit 24%. Thus a reduction of 18 percentage points is required. The computed price index is 3.862; reduce this by 18% so as to become 3.167, and replace T87 value 4.0 by this value 3.167. A few iterations are enough, to reach approximate consistency of the computed price index.

INPUT-OUTPUT AND ENERGY DEMAND MODELS FOR IRELAND

Data collection report

E.W. Henry and S. Scott

Part II: EDM

CONTENTS

PART II ENERGY SUBMODEL

DATABASE:

DATA SOURCES FOR ENERGY DEMAND

Information on energy demand had to be prepared for each year 1962 to 1973 inclusive. An example for 1970 is shown in Table 1 overleaf. Various official and unofficial sources were used to obtain this data. Some detailed figures of industries' purchases of different fuels, are supplied by the Central Statistics Office and the figures of total fuel purchases by major sectors are given in the OECD Energy Statistics. Details for each of these two sources in turn are as follows:

Purchases of different fuels by industries

This data is collected annually in the Census of Industrial Production and includes the following fuels: coal, coke, turf, DERV, other gas/diesel oil, fuel oil, petrol, electricity, gas and other fuels. Information is given on quantitites as well as expenditure except for the years 1962 and 1968 to 1971 inclusive for which quantities had to be estimated from the expenditure, using price data. The industries entitled 'metal trades' and 'paper and products' had to be adjusted in order to be compatible with the EDM industries entitled 'iron and steel' and 'pulp and paper' respectively. So the correspondence between the Census of Industrial Production (CIP) classification and the EDM energy consuming sectors is as follows:

CIP classification number	EDM energy consuming sectors
44 part	Iron and steel
3	Alluminium and other non-ferrous
41	Glass
43, 2, 42	Cement and other building materials
37 to 40 inclusive	Chemicals
33 part	Pulp and paper
Remainder of Total manufacturing less energy sectors, plus construction, plus agriculture, forestry and fishing	Other Industries
All industries purchases of carburants	Land transportation (using Carburants)

1970 10^3 Thermies

Table 1.

		Iron and Steel	Non-Ferrous Metals	Glass	Cement	Other Building Material	Chemicals	Pulp and Paper	Other Industries	Land Transport-ation	Sea Air Transport-ation	Other Services	Private Transport-ation	Other househ. uses (incl. heating	Total
1 (a)	Coal	2, 890	298	446	55, 040	40, 098	1, 534	22, 139	1, 222, 696	0	0			5, 130, 809	6, 475, 950
1 (b)	Turf	195		24		4, 541	0	4, 088	64, 055					3, 427, 097	3, 500, 000
2	Coke	10, 156	0	0	0	0	0	0	116, 012					67, 000	193, 168
3	Gas	12, 583	330	71, 377		7, 417	5, 697	1, 651	271, 873			77, 022		1, 172, 050	1, 620, 000
4	Curburants									256, 039	3, 217, 620		6, 827, 801		10, 301, 460
5	Gas oil/ Dom. Fuel oil (incl. Diesel)	2, 673	8, 470	2, 183	3, 794	44, 400	3, 172	342	1, 866, 140	2, 190, 000	164, 250	4, 409, 791		4, 165, 200	12, 860, 415
6	Heavy Fuels	82, 196	13, 092	496, 501	977, 699	419, 178	222, 413	217, 089	4, 940, 967						20, 229, 550
7	Naphthas														7, 369, 135
8	Hydrogen														
9	Electricity	25, 075	86, 448	38, 038	75, 533	128, 457	144, 086	64, 891	1, 488, 099					2, 077, 373	4, 128, 000

OECD data on fuel purchases by major sector

The OECD data is expressed in thousand metric tonnes (mkwh for electricity) and recent years' figures have been re-estimated by the authors on the basis of detailed information supplied by the Central Statistics Office. The correspondence between OECD data and the EDM energy consumming sectors is as follows:

OECD energy consuming sectors	EDM energy consuming sectors
Road transport, railways	Land transportation (using gas/diesel oil and coal).
Air transport, internal and coastal navigation	Sea and Air transportation
Residual obtained on subtraction of all entries from the Total (given below)	Other services
Residual of carburants when Land transportation is subtracted from the Total (given below)	Private transportation (carburants only)
Consumption of the other (OECD definition) sectors, less agriculture	Other Household uses
Total Internal Final Consumption less Consumption by the "energy" sector	Total

This list together with the previous list gives a complete summary of how the data on fuel purchases was obtained. It will be noticed that other household uses will include consumption of energy by commerce and services which, correctly speaking, should be included in other services. No information is available to facilitate a correct allocation. Also, other services being calculated as the difference between two large numbers will be subject to inaccuracies.

All data was originally expressed in physical quantities which had to be converted into thousands of thermies, using the following conversion factors:

1 ton of coal	=	7.112×10^3 thermies
1 ton of coke	=	6.807 x " "
1 ton of turf	=	3.201 x " "
k gallons of fuel /diesel oil	=	41.508 x " "
k gallons of fuel oil	=	43.785 x " "
k gallons of petrol	=	37.577 x " "
k kwh of electricity	=	0.86 x " "
k cu. ft. of towns gas	=	0.119 x " "
1 cwt. of LPG	=	0.607 x " "
1 tonne of LPG	=	11.950 x " "
1 tonne of aviation or motor gasoline	=	11.280 x " "
1 tonne of jet fuel	=	11.330 x " "
1 tonne of kerosene	=	11.000 x " "
1 tonne of gas/diesel oil	=	10.950 x " "
1 tonne (i.e. "metric tone")	=	0.98421 ton (i.e. "long ton")
1 tonne of oil equivalent	=	10×10^3 thermies (10,000 termies)

DATA SOURCES FOR THE EXPLANATORY VARIABLES

All available basic information has been used to estimate the independent (or explanatory) variables. Most of this information has come from the Central Statistics Office (CSO), through publications such as the Trade Statistics of Ireland (monthly), the Irish Statistical Bulletin (quarterly), the National Income and Expenditure (annual), and through further unpublished information supplied directly to the authors, such as the 1969 R44 input-output (I-O) table.

There are eight groups of exogenous variables and what follows is a summary description of the sources and methods used to estimate the numerical data for each group. The time series generally are for the years 1962-1973.

(1) Gross output at 1970 prices

For manufacturing, mining and construction industries the 1970 gross output of about 60 sectors was projected backwards and forwards by means of annual (1962-72) and quarterly (1973-74) volume index numbers; these projections were grouped and finally scaled to accord with 1969 I-O orders of magnitude, by comparing 1969 group aggregates with the 1969 I-O values.

For agriculture, the published volume of output was weighted by 1969 I-O gross output.

For transport a variety of estimation procedures was used. Published annual reports gave physical measures of rail and air transport. The road and sea transport estimation was done less directly, but finally linked into the 1969 I-O estimates.

For other services, the National Accounts at 1970 prices

were used in unpublished detail and weighted in detail by 1969 I-O gross outputs.

The household consumption (or personal expenditure) estimates at 1970 prices are published in the National Income and Expenditure document.

(2) Physical quantities of selected commodities

Results for cement are published. For iron and steel, which has very small activity, direct tonnages were not available; price deflation of value figures was the main method. For paper, a mixture of actual tonnages and price deflation of values has been used. Thus the time series for tonnages of cement is a much more certain figure than either of the other two time series.

(3) Value Added at 1970 prices

The annual Census of Industrial Production provided Net Output at current prices for 1962-73. This was deflated, for each of about 60 industries, by the Consumer Price Index and then linked to the 1969 I-O gross value added at factor cost, to get the right scaling. This method covered mining, manufacturing and construction. Within these the iron and steel, cement, and paper components were estimated by taking a share of the Census industry net output at 1970 prices in proportion to their gross output share.

The National Accounts and other CSO data, as well as company reports, gave the basis for estimating the other value added estimates, in parallel with gross output, as described in (1) above.

(4) Wages and Salaries at 1970 prices

For mining and manufacturing, the CSO quarterly data on weekly earnings were averaged and used to construct a deflator within each of about

50 industries. The deflated annual Census wages and salaries were then grouped and the iron etc., cement, and paper components taken out of the Census industries which included them, in proportion to gross output at 1970 prices.

Various National Accounts data on wages and salaries at current and at 1970 prices were used to construct deflators which were applied to the series, at current prices, for transport and services.

(5) Employment, in thousand manyears

The major components were readily available as time series over 1962-74. More detail arose from several sources: Census of Population industrial classifications for 1961, 1966 and 1971; the annual Census of mining, manufacturing and construction; Irish Statistical Bulletin annual reports on numbers employed in rail transport, road freight, road passenger services; further detail from the CSO. The iron etc., cement and paper components were estimated as in (4) above.

(6) Price per Unit for Energy Demand Model

Several data sources were available. The CSO gave most series, as used for deflating personal expenditure. The Electricity Supply Board annual reports provided price data for electricity.

(7) Other Explanatory Variables

The CSO provided those on population, households and consumer price index. Television licence data were given by the Post Office; the temperature and degree days by the Meteorological Service. The Department of Local Government supplied the car licence data.

(a) TIME SERIES DATA OF ENERGY DEMAND

Given on the following pages are the data for energy demand, 1962 to 1973 inclusive, for each type of fuel, expressed in 10^3 thermies. Each demand variable has a D prefix in its code.

There follows the data for the explanatory variables, 1962 to 1973 inclusive, namely:

Code	Variable	Unit
G (prefix)	Gross output	£million, 1970 prices
	Projected gross outputs 1980,1985	" " " "
I (prefix)	Indices of gross output	1970 = 100
Q (prefix)	Quantities of selected commodities	10^3 tonnes
V (prefix)	Value added	£ million, 1970 prices
W (prefix)	Wages and salaries	" " " "
E (prefix)	Employment	10^3 manyears
P (prefix)	Price of each fuel	£ per tonne (gas: pertherm electricity: per 10^3 Kwh)
TV	Televisions, licensed	10^3
POP	Population	10^3
HH	Number of households	10^3
TEMP	Temperature, average mean monthly	Degrees Fahrenheit
TEMPD	Degree days below 60^oF, previous October to September.	
CPI	Consumer price index (for deflating fuel prices)	1970 = 100
AU	Automobiles, private car licences	10^3
TD(prefix)	Total demand for fuel	10^3 thermies
ITD "	Intensity: Total demand for fuel per unit of gross output	10^3 thermies/£million
P	CPI for "Fuel and Light" relative to "All Items"	
HHC	Household Consumption	£million, 1970 prices

Prefix codes are followed by 2 letter fuel codes and/or 2 letter industry codes. The fuel and industry codes are given overleaf.

Fuel Codes

CL	Coal
TF	Turf
CK	Coke
GA	Gas
CA	Carbwants
GO	Gas oil/com. fuel oil
DO	Diesel oil (only for price)
HF	Heavy fuels
EL	Electricity

Industry Codes

IS	Iron
NM	Non-ferrous metals
GL	Glass
CE	Cement
OB	Other building materials
CH	Chemicals
PP	Pulp and paper
OI	Other industries
LT	Land transformation
SA	Sea, air transport
OS	Other services
PT	Private transport
OH	Other household uses

IRON AND STEEL

OBS.NO.	DISCL	DISTF	DISCK	LIGN	DISGT	DISMF	DISTL
1	1173.	1[illegible].	1564.	3714.	526.	4916.	7961.
2	786.	1[illegible].	10279.	4022.	1356.	41272.	4488.
3	662.	29[illegible].	11610.	4273.	1307.	35572.	13153.
4	864.	213.	13[illegible].	4295.	2967.	35706.	13136.
5	640.	248.	1 381.	5651.	1316.	32446.	11277.
6	652.	217.	11156.	7032.	2155.	36637.	12256.
7	2046.	542.	1 234.	3578.	2275.	34105.	14065.
8	2312.	198.	1[illegible].	3841.	2475.	[illegible].	16755.
9	2890.	195.	10156.	12503.	2673.	32196.	25075.
10	2597.	231.	9965.	13715.	2466.	26762.	27226.
11	1108.	1[illegible].	19371.	11533.	3144.	11[illegible].	32[illegible].
12	480.	124.	8319.	15143.	3642.	14841[illegible].	47640.

NON-FERROUS METALS

OBS.NO.	DNMCL	DNMCK	DNMCA	DNMGC	DNMTF	DNMTL
1	142.	53.	570.	[illegible]E+0[illegible]	3889.	11961.
2	[illegible].	[illegible]E+0[illegible]	137.	298.	306.	2838.
3	[illegible].	[illegible]E+0[illegible]	[illegible].	291.	306.	2338.
4	[illegible].	[illegible]E+0[illegible]	[illegible].	1536.	2653.	4537.
5	[illegible].	[illegible]E+0[illegible]	[illegible].	6143.	13394.	16657.
6	36.	[illegible]E+0[illegible]	[illegible].	1808.	25183.	31944.
7	6.	[illegible]E+0[illegible]	191.	2786.	21491.	63676.
8	0.	[illegible]E+0[illegible]	1[illegible].	2447.	17147.	72299.
9	29[illegible].	[illegible]E+0[illegible]	22[illegible].	9470.	13992.	86+48.
10	139.	[illegible]E+0[illegible]	169.	13722.	35138.	11[illegible].
11	135.	[illegible]E+0[illegible]	132.	4406.	64802.	10847[illegible].
12	412.	[illegible]E+0[illegible]	394.	45285.	38224.	114[illegible].

GLASS

OBS.NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1							
2	2138.	[illegible]	[illegible]	124[illegible]	7338.	232[illegible]	17[illegible]
3	2134.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	1588.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	1[illegible]74.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	24.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CEMENT

OBS.NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

OTHER BUILDING MATERIALS

OBS.NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	[illegible]	34216.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	4 155.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	23447.[illegible]	4[illegible]	1297.[illegible]	46447.[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	56473.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	54267.[illegible]	3379.[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	14[illegible]	26253.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	6212.[illegible]	175[illegible]	6439.[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	4541.[illegible]	[illegible]	7417.[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	0.[illegible]E+0 <0	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	20.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	46832.[illegible]	1839.[illegible]	545.[illegible]	5210.[illegible]	145610.[illegible]	614785.[illegible]	143183.[illegible]

CHEMICALS

OBS.NO.	DCFCL	DCHTF	DCHCK	DCHCA	DCHCO	DCHHF	DCHEL
1	[illegible]	127.[illegible]	1435.[illegible]	2840.[illegible]	[illegible]	117019.[illegible]	16017.[illegible]
2	[illegible]	[illegible]	1382.[illegible]	2429.[illegible]	5272.[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	1293.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	1765.[illegible]	[illegible]	1545.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	1498.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	725.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PAPER AND PULP

OBS.NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	28565.	21641.	1.	5965.	556.	123348.	46222.
2	3541.	27962.	138.	6652.	324.	146558.	48011.
3	5610.	38189.	138.	6953.	497.	139683.	59367.
4	8022.	29206.	158.	5461.	210.	135585.	41752.
5	16774.	28962.	131.	5501.	139.	130283.	55075.
6	39167.	19685.	92.	3704.	219.	109951.	42951.
7	44295.	14883.	45.	4465.	253.	132 38.	58178.
8	56429.	13423.	29.	1359.	537.	21474.	58763.
9	22193.	4088.	0.	1951.	342.	21789.	64891.
10	19213.	737.	0.	1722.	317.	27651.	47308.
11	55.	52.	0.	1344.	459.	380384.	63567.
12	134.	787.	0.	1381.	459.	367589.	59374.

OTHER INDUSTRIES

OBS.NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	1581190.	113697.	147426.	63179.	1196043.	2910195.	562413.
2	1336165.	151488.	181531.	87676.	1226573.	3479491.	583304.
3	1242915.	141313.	167645.	97758.	1163938.	3255724.	665226.
4	1136742.	124381.	150541.	108346.	1342073.	4033165.	737411.
5	1014499.	119958.	146288.	121768.	1326734.	3977630.	767645.
6	1001629.	83537.	143171.	151924.	1314164.	3959393.	648952.
7	1028527.	75233.	134526.	214169.	1425152.	3822343.	954477.
8	952966.	59378.	125100.	221844.	1571448.	4196512.	1082700.
9	1225830.	64350.	116012.	271373.	1856145.	4944907.	1433899.
10	1011364.	38312.	106129.	304749.	1969782.	5218099.	1651925.
11	526863.	19671.	84434.	243141.	2180377.	5616586.	1746289.
12	251517.	15922.	78362.	273696.	2393481.	6155625.	1703414.

LAND TRANSPORT

OBS.NO.	[illegible]	[illegible]	[illegible]
1	[illegible]	213643.	[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
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5	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]

SEA AND AIR TRANSPORT

OBS.NO.	[illegible]	[illegible]	[illegible]
1	[illegible]	961583.	[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
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6	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]

OTHER SERVICES

OBS.NO.	[illegible]	[illegible]	[illegible]
1	2.776[illegible]	[illegible]	[illegible]
2	123995.[illegible]	[illegible]	[illegible]
3	225653.[illegible]	[illegible]	[illegible]
4	25 [illegible]	[illegible]	[illegible]
5	137141.[illegible]	[illegible]	[illegible]
6	51924.[illegible]	[illegible]	[illegible]
7	3021.[illegible]	[illegible]	[illegible]
8	27143.[illegible]	44[illegible]	[illegible]
9	[illegible]	77[illegible]	[illegible]
10	[illegible]	67762.[illegible]	[illegible]
11	[illegible]	197658.[illegible]	[illegible]
12	[illegible]	201024.[illegible]	[illegible]

PRIVATE TRANSPORT

OBS.NO.	[illegible]
1	33[illegible]
2	3[illegible]
3	4[illegible]
4	441744[illegible]
5	467762[illegible]
6	3[illegible]
7	5[illegible]
8	6[illegible]
9	5[illegible]
10	75[illegible]
11	[illegible]
12	87[illegible]

OTHER HOUSEHOLD USES

OBS.NO.						
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(b) EXPLANATORY VARIABLES

GROSS OUTPUT

OBS.NO.								
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

GROSS OUTPUT CONT'D

OBS.NO.	?LT	?SA	??
1	[illegible]	[illegible]	[illegible]
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4	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]
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8	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]

HOUSEHOLD CONSUMPTION

?HC
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[illegible]
[illegible]

INDEX OF GROSS OUTPUT

OBS.NO.	IIS	IIM	IGL	IGE	IGB	IGH	IPB
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	101	[illegible]	[illegible]	[illegible]	[illegible]
1	72.[illegible]	37.[illegible]	49.[illegible]	74.[illegible]	73.[illegible]
2	75.[illegible]	90.[illegible]	53.[illegible]	76.[illegible]	76.[illegible]
3	79.[illegible]	92.[illegible]	58.[illegible]	79.[illegible]	79.[illegible]
4	81.[illegible]	95.[illegible]	61.[illegible]	81.[illegible]	81.[illegible]
5	82.[illegible]	95.[illegible]	66.[illegible]	84.[illegible]	82.[illegible]
6	87.[illegible]	97.[illegible]	73.[illegible]	89.[illegible]	89.[illegible]
7	93.[illegible]	1 2.[illegible]	79.[illegible]	95.[illegible]	92.[illegible]
8	97.[illegible]	1 3.[illegible]	91.[illegible]	98.[illegible]	97.[illegible]
9	101.[illegible]	10.[illegible]	101.[illegible]	103.[illegible]	101.[illegible]
10	104.[illegible]	102.[illegible]	106.[illegible]	104.[illegible]	102.[illegible]
11	109.[illegible]	105.[illegible]	96.[illegible]	108.[illegible]	108.[illegible]
12	116.[illegible]	117.[illegible]	115.[illegible]	114.[illegible]	114.[illegible]

VALUE ADDED

OBS.	VFS	VBP	VSL	VCF	VEP	VTI	VBP	VT
1	1.[illegible]	[illegible]	3.39[illegible]	3.1[illegible]	[illegible]	12.3[illegible]	3.61[illegible]	[illegible]
2	1.[illegible]	[illegible]	4.1[illegible]	3.28[illegible]	9.93[illegible]	15.3[illegible]	3.68[illegible]	51[illegible]
3	2.54[illegible]	[illegible]	4.43[illegible]	5.69[illegible]	11.42[illegible]	13.2[illegible]	3.57[illegible]	547.[illegible]
4	2.47[illegible]	[illegible]	4.46[illegible]	4.[illegible]	12.86[illegible]	15.[illegible]	3.36[illegible]	546.[illegible]
5	2.3[illegible]	4.31[illegible]	4.0[illegible]	3.63[illegible]	13.[illegible]	18.[illegible]	5.[illegible]	561.[illegible]
6	2.45[illegible]	6.13[illegible]	5.41[illegible]	4.16[illegible]	16.25[illegible]	24.52[illegible]	5.[illegible]	596.[illegible]
7	2.55[illegible]	9.94[illegible]	5.51[illegible]	4.35[illegible]	17.33[illegible]	27.97[illegible]	4.34[illegible]	651.[illegible]
8	2.63[illegible]	13.40[illegible]	6.85[illegible]	4.4[illegible]	20.59[illegible]	30.90[illegible]	4.34[illegible]	672.[illegible]
9	2.81[illegible]	14.42[illegible]	7.34[illegible]	5.[illegible]	19.45[illegible]	30.14[illegible]	4.63[illegible]	695.[illegible]
10	2.82[illegible]	11.04[illegible]	7.27[illegible]	5.52[illegible]	24.41[illegible]	31.[illegible]	4.64[illegible]	710.[illegible]
11	3.55[illegible]	12.37[illegible]	8.74[illegible]	6.[illegible]	28.42[illegible]	34.20[illegible]	5.30[illegible]	784.[illegible]
12	4.54[illegible]	16.96[illegible]	9.59[illegible]	6.35[illegible]	30.42[illegible]	44.73[illegible]	6.79[illegible]	875.72[illegible]

OBS.	VLT	VSA	VBS
1	49.55[illegible]	12.17[illegible]	397.22[illegible]
2	56.3[illegible]	13.01[illegible]	435.[illegible]
3	55.[illegible]	14.14[illegible]	451.73[illegible]
4	51.73[illegible]	14.30[illegible]	444.[illegible]
5	51.68[illegible]	14.33[illegible]	459.17[illegible]
6	56.55[illegible]	16.73[illegible]	486.37[illegible]
7	59.38[illegible]	19.54[illegible]	511.91[illegible]
8	63.05[illegible]	25.45[illegible]	552.[illegible]
9	68.55[illegible]	28.74[illegible]	575.21[illegible]
10	69.33[illegible]	29.[illegible]	613.73[illegible]
11	71.65[illegible]	29.47[illegible]	665.39[illegible]
12	78.39[illegible]	34.67[illegible]	724.52[illegible]

WAGES AND SALARIES

MPS.NO.	WPS	WPA	WOL	WOT	WOB	WOF	WPP
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.760000	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.870000	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MPS.NO.	WCI	WLT	WSA	WLS
1	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]

EMPLOYMENT

CRS.NO.	FIS	[illegible]	ECI	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	1.25	[illegible]	2.70	[illegible]	4.75	[illegible]	[illegible]	593.79
2	[illegible]	[illegible]	2.90	[illegible]	5.33	[illegible]	2.4	[illegible]
3	[illegible]	[illegible]	2.08	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	3.74	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	3.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	3.09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	3.25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	3.44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	3.95	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	4.11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	4.73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	4.88	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CRS.NO.	FLT	TSA	FDS
1	44.95	[illegible]	363.15
2	44.18	[illegible]	367.43
3	43.54	[illegible]	371.60
4	43.42	[illegible]	376.38
5	43.24	[illegible]	381.67
6	42.66	[illegible]	386.88
7	43.77	[illegible]	391.34
8	45.92	[illegible]	395.92
9	44.14	[illegible]	399.56
10	44.73	[illegible]	401.51
11	44.27	[illegible]	408.63
12	46.23	[illegible]	414.67

PRICES

OBS. NO.	PCL	PCK	PCF	PCA	PCT	PCS	PD
1	9.83	8.45	7.87	.12	72.38	26.67	48.25
2	10.00	8.49	8.12	.12	73.14	27.83	46.26
3	11.64	9.35	8.24	.13	72.54	27.81	47.83
4	11.47	9.54	8.51	.12	81.27	27.91	53.57
5	11.14	10.04	9.37	.12	82.35	28.06	55.07
6	11.24	11.83	10.25	.13	82.35	28.46	54.17
7	11.63	11.49	11.29	.13	85.23	29.35	52.18
8	13.19	11.84	10.29	.14	88.30	29.53	61.13
9	12.7	13.00	11.30	.14	94.84	31.36	64.21
10	16.93	12.31	11.63	.16	96.63	33.65	62.75
11	21.76	12.51	14.17	.15	96.92	36.15	58.36
12	22.13	16.50	15.10	.15	102.27	38.63	70.79

OBS. NO.	PIF	PEL
1	7.66	8.67
2	7.38	8.58
3	7.69	8.38
4	6.30	8.17
5	6.60	8.35
6	5.56	8.36
7	6.52	6.50
8	5.71	8.90
9	6.34	9.75
10	7.10	9.32
11	7.70	11.57
12	9.13	11.35

OBS. NO.	TV							
1	[illegible]	[illegible]	[illegible]	48. [illegible]	4455.0 [illegible]	[illegible]	214. [illegible]	97.1 [illegible]
2	[illegible]	[illegible]	[illegible]	47.7 [illegible]	4566.0 [illegible]	[illegible]	237.1 [illegible]	1 [illegible]
3	[illegible]	[illegible]	[illegible]	49.5 [illegible]	3841. [illegible]	[illegible]	263.3 [illegible]	94.5 [illegible]
4	[illegible]	[illegible]	[illegible]	48.1 [illegible]	4033. [illegible]	[illegible]	291.2 [illegible]	91.9 [illegible]
5	[illegible]	[illegible]	[illegible]	46.3 [illegible]	3981. [illegible]	[illegible]	306.8 [illegible]	91. [illegible]
6	[illegible]	[illegible]	[illegible]	49.3 [illegible]	4133. [illegible]	[illegible]	325.3 [illegible]	94. [illegible]
7	[illegible]	[illegible]	[illegible]	49.3 [illegible]	4247. [illegible]	[illegible]	348.3 [illegible]	87.9 [illegible]
8	[illegible]	[illegible]	[illegible]	48.7 [illegible]	4099.0 [illegible]	[illegible]	375.3 [illegible]	87.9 [illegible]
9	[illegible]	[illegible]	[illegible]	49.5 [illegible]	4048. [illegible]	[illegible]	386.3 [illegible]	87.9 [illegible]
10	[illegible]	[illegible]	[illegible]	50.4 [illegible]	3856. [illegible]	[illegible]	414.1 [illegible]	91.5 [illegible]
11	[illegible]	[illegible]	[illegible]	49.1 [illegible]	4[illegible]	[illegible]	440.2 [illegible]	92.8 [illegible]
12	[illegible]	[illegible]	[illegible]	49.3 [illegible]	3786. [illegible]	[illegible]	476.7000000	87.9000000

INTENSITIES: TOTAL DEMAND FOR ENERGY ÷ GROSS OUTPUT

OBS. NO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	3[illegible].8274213	41597.9[illegible]	22[illegible].[illegible]	15417.3[illegible]1325	5[illegible].[illegible]	241.[illegible]
2	181.[illegible]9	13[illegible]52.[illegible]	[illegible].[illegible]	14471.[illegible]320637	57[illegible].5[illegible]2253	2[illegible].[illegible]
3	3[illegible].76[illegible]7396	12626.[illegible]96	25121.91977[illegible]	15797.1138657	5178.[illegible]5952	25[illegible].1[illegible]
4	312.5[illegible]27115	14[illegible]7.971720[illegible]	24[illegible].[illegible]7254	16379.6617162	57[illegible].[illegible]2[illegible]	24[illegible].7[illegible]4477
5	[illegible]6.2217348	16527.1739130	26557.711[illegible]18	18768.2491647	5[illegible].[illegible]4741	29732.5[illegible]
6	3593.8761893	23345.[illegible]19[illegible]	28[illegible]3.3[illegible]3744	16916.2[illegible]52	5[illegible].[illegible]5	31[illegible].[illegible]
7	2762.4226825	22297.7272727	27316.[illegible]9	16[illegible].[illegible]	4[illegible].[illegible]	27[illegible].[illegible]
8	3960.5583586	6[illegible]5.[illegible]39[illegible]	28[illegible].[illegible]22	14309.[illegible]7030	5136.[illegible]74	28[illegible].[illegible]
9	4[illegible]9.9956[illegible]	60825.[illegible]	32[illegible].[illegible]	20[illegible].[illegible]	6[illegible].[illegible]	27[illegible].[illegible]
10	6[illegible].651[illegible]97	75835.4[illegible]8711	33150.7[illegible]87629	14328.[illegible]30222	5[illegible].4[illegible]515	29[illegible].[illegible]
11	4986.3[illegible]490	73729.2771539	34472.[illegible]9697	14239.70[illegible]340	5815.1399[illegible]	34[illegible].51[illegible]
12	6265.1596362	52229.[illegible]1607	24[illegible]39.5367232	14[illegible].[illegible]92638	5[illegible].2890[illegible]	34[illegible].6547619

INTENSITIES (Contd.)

REG.NO.				TEGL		
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14073.736715[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	19396.253[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	16663.27[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9397.13[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TOTAL DEMAND FOR FUELS

REG.NO.	TEGF	TEGS	TEGA	TEGJ	TEGO	TEGP	TEGH
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	215231.[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

OBS.NO.	PCOM	TDOL	PPOL	TDPM	TDPS
1	2.85237E+06	1.56E+06	231788.	19823.	9498.
2	3.23326E+06	1.57E+06	275671.	8450.	6736.
3	3.57067E+06	1.44E+06	265128.	2986.	6386.
4	4.25261E+06	1.38E+06	277462.	8131.	6212.
5	4.34328E+06	1.11E+06	248337.	38154.	5239.
6	4.36291E+06	1.27E+06	248428.	50431.	6934.
7	4.45381E+06	1.22E+06	241753.	35072.	7185.
8	5.60991E+06	1.21E+06	410733.	92007.	8923.
9	6.44091E+06	1.11E+06	604569.	128638.	13576.
10	9.55926E+06	1.26E+06	694775.	196231.	14569.
11	8.93163E+06	1.24E+06	570144.	177988.	17347.
12	9.58004E+06	1.26E+06	654251.	198293.	22075.

REAL PRICES (DEFLATED BY C.P.I.)

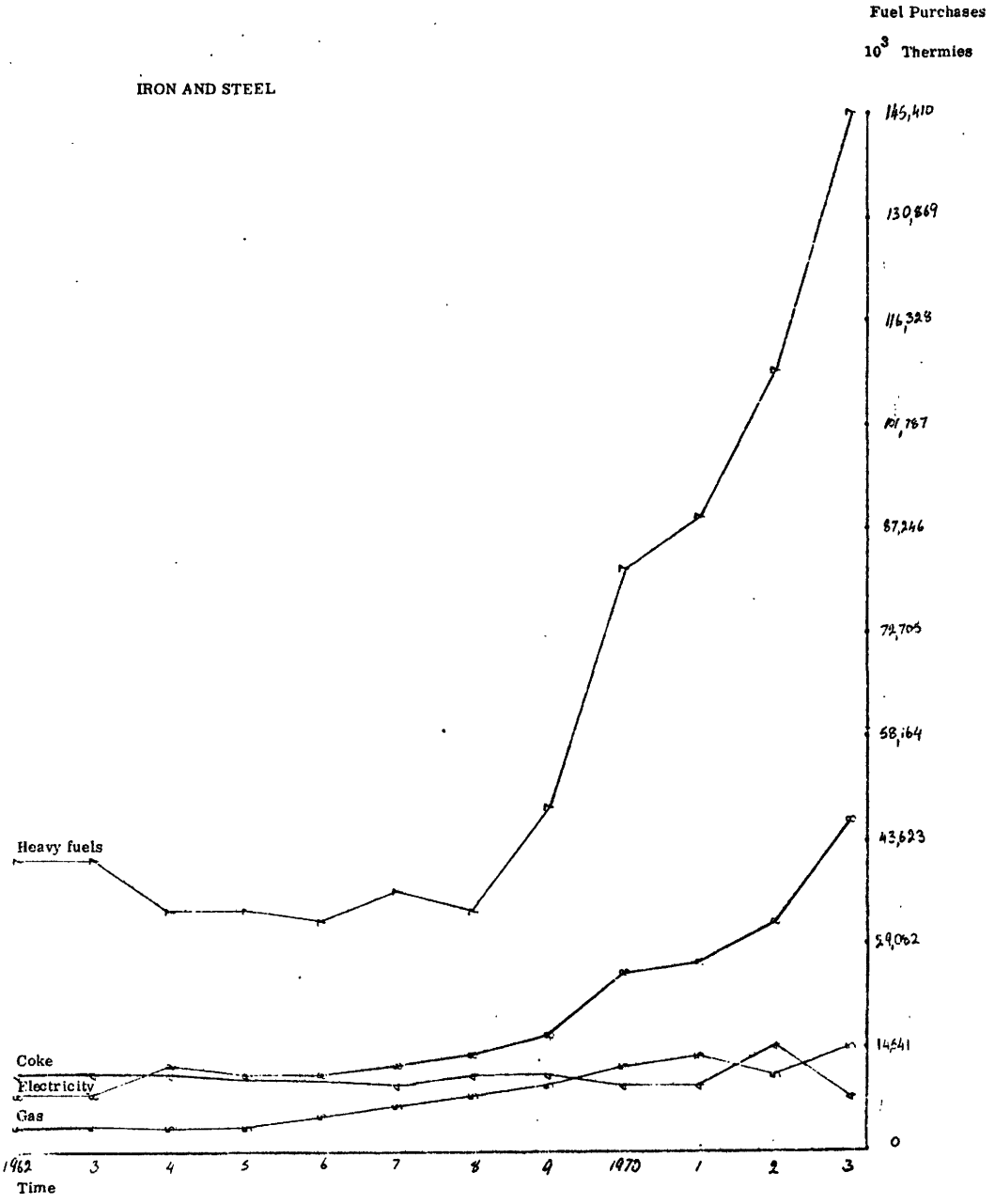
OBS.NO.	PCOL/CPI	PPOF/CPI	PDOC/CPI	PCOS/CPI	PCAS/CPI	PCAT/CPI	PTF/CPI
1	14.6237947	11.3890818	67.2242565	39.5483553	108.2157183	0.1797653	11.692176
2	15.4849835	11.7[illegible]39	68.4[illegible]2855	33.[illegible]74753	106.[illegible]7[illegible]	0.1[illegible]41380	11.7732347
3	15.8605467	9.5317225	69.2[illegible]0870	37.7[illegible]53261	98.5597826	0.1725543	11.195452[illegible]
4	14.9422553	8.1[illegible]3744	66.74[illegible]225	36.[illegible]20934	102.9824[illegible]	0.1669471	11.536[illegible]952
5	14.5[illegible]24828	8.2[illegible]8[illegible]2	7[illegible].1619902	35.2379756	103.4157[illegible]	0.1619992	11.744[illegible]22
6	13.4780[illegible]83	5.77[illegible]1167	73.2242383	34.6111726	100.[illegible]219 561	0.1606426	12.474[illegible]26
7	13.[illegible]214836	7.3[illegible]74869	72.[illegible]55459	34.[illegible]39391	99.2093943	0.1581211	11.963[illegible]51
8	14.1[illegible]46447	6.1[illegible]73[illegible]9	66.21[illegible]13	31.9598745	95.[illegible]238[illegible]52	0.1511152	11.136[illegible]36
9	14.[illegible]7[illegible]0[illegible]	5.3[illegible]8[illegible]	64.[illegible]21[illegible]	3.[illegible]360[illegible]	94.84[illegible]0[illegible]	0.1436[illegible]	11.3[illegible]
10	15.[illegible]4[illegible]5[illegible]	4.[illegible]524 54[illegible]	6[illegible].[illegible]247437	31.[illegible]690659	88.[illegible]455261	0.1466968	10.6501184
11	13.[illegible]4[illegible]4[illegible]	5.[illegible]217641[illegible]	57.6715106	34.5424[illegible]	9[illegible].8857722	0.1377154	11.971[illegible]
12	14.7[illegible]2[illegible]6[illegible]	4.[illegible]2[illegible]97[illegible]	6[illegible].[illegible]044315	29.2823547	77.5831578	0.1191018	11.53[illegible]5315

MES.NO.	PCK/CPE	FLT/CPE
1	11.34473 33	12.86[illegible]
2	12.2[illegible]9999	12.44[illegible]
3	12.7[illegible]43	11.38[illegible]
4	12.73454 71	11.[illegible]
5	10.4[illegible]3134	11.36[illegible]
6	12.[illegible]6[illegible]949	11.19[illegible]
7	13.3[illegible]9113	0.07[illegible]
8	12.81[illegible]	0.56[illegible]
9	12.[illegible]	0.07[illegible]
10	11.2926913	0.01[illegible]14
11	10.56[illegible]	0.99[illegible]
12	12.1277636	0.01[illegible]

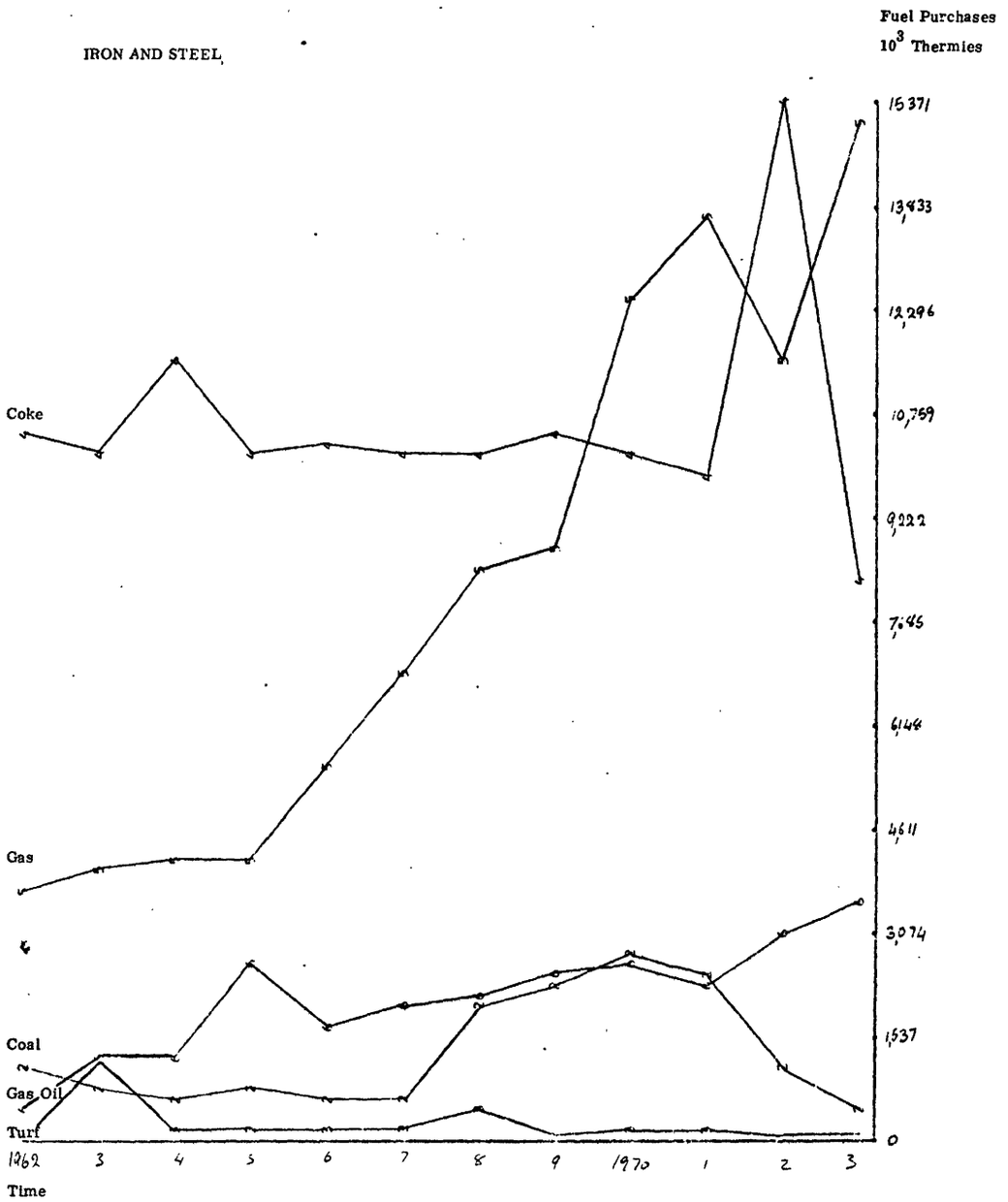
QUANTITIES FOR SPECIAL ENERGY CONSUMERS

[illegible]	[illegible]	[illegible]	[illegible]
1	[illegible]	887.[illegible]	88.[illegible]
2	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]

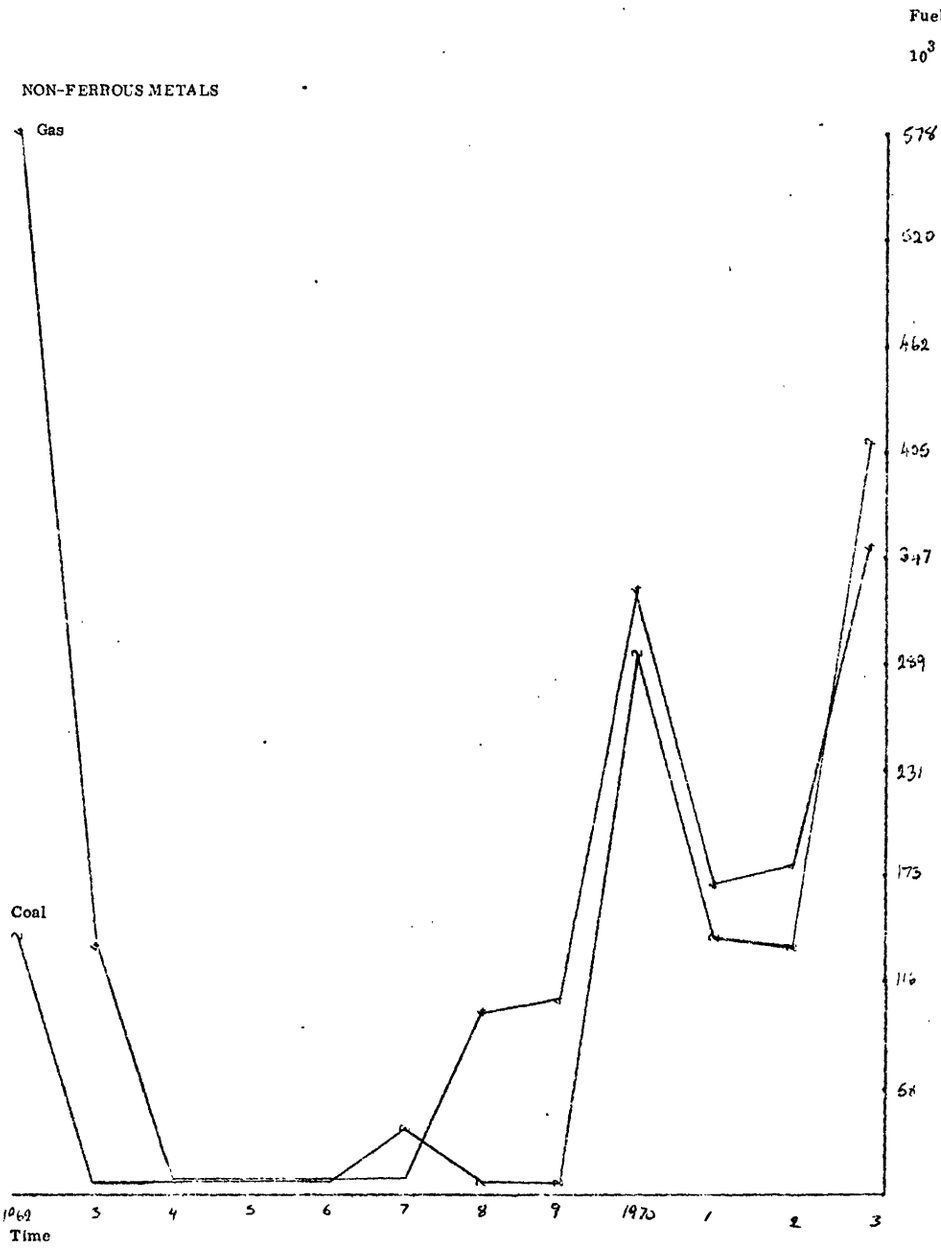
(d) Graphs of Energy Demand

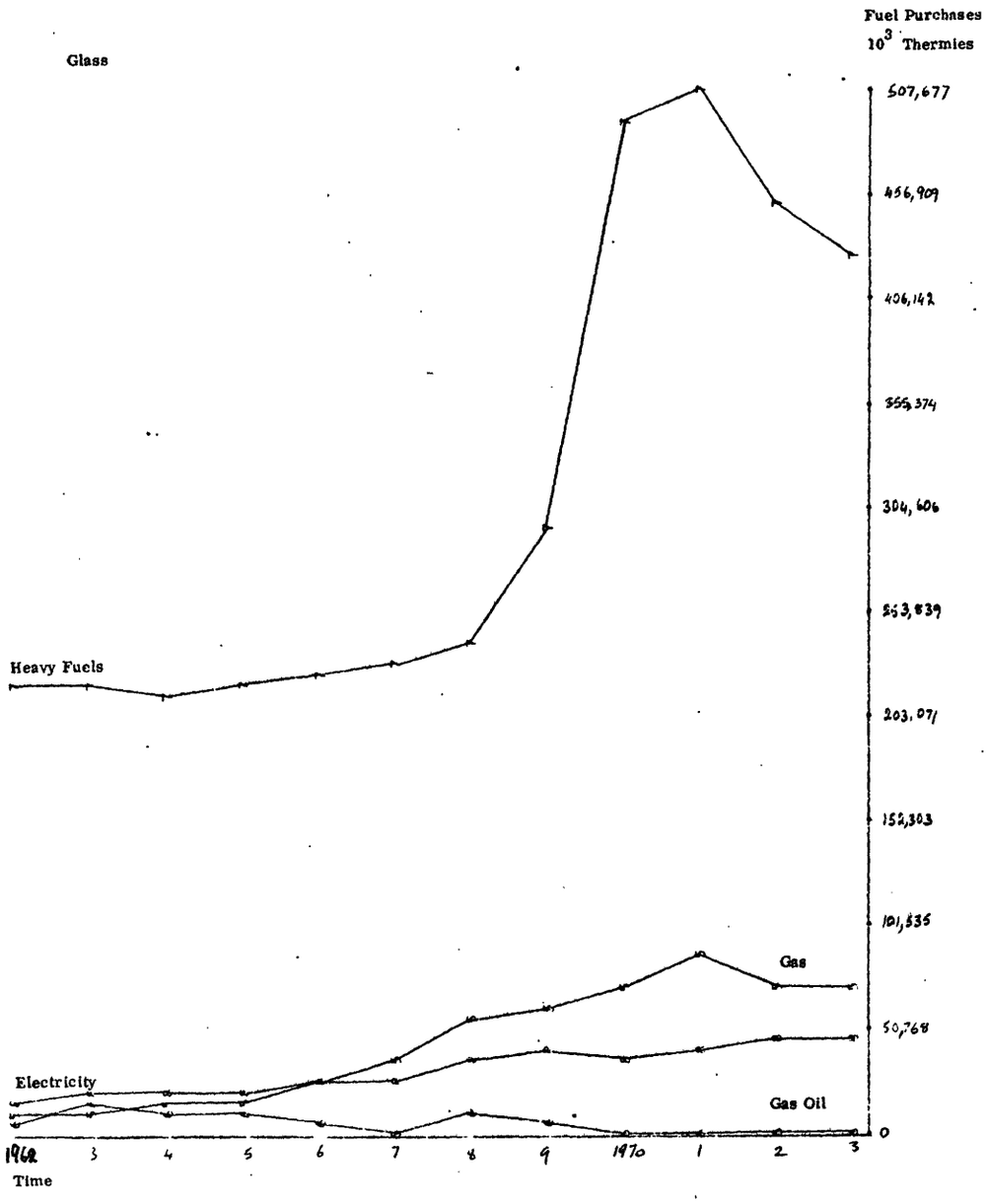


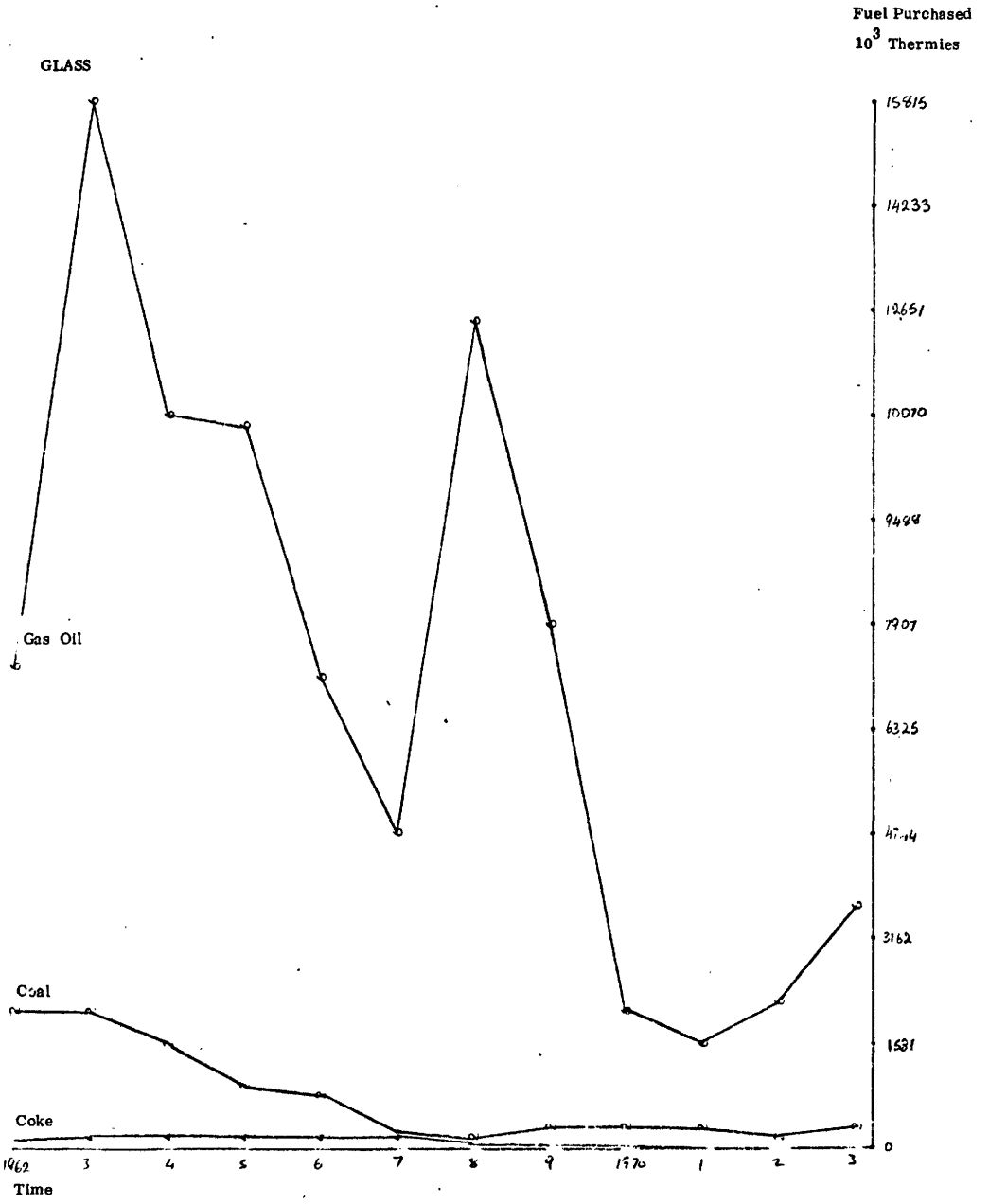
IRON AND STEEL

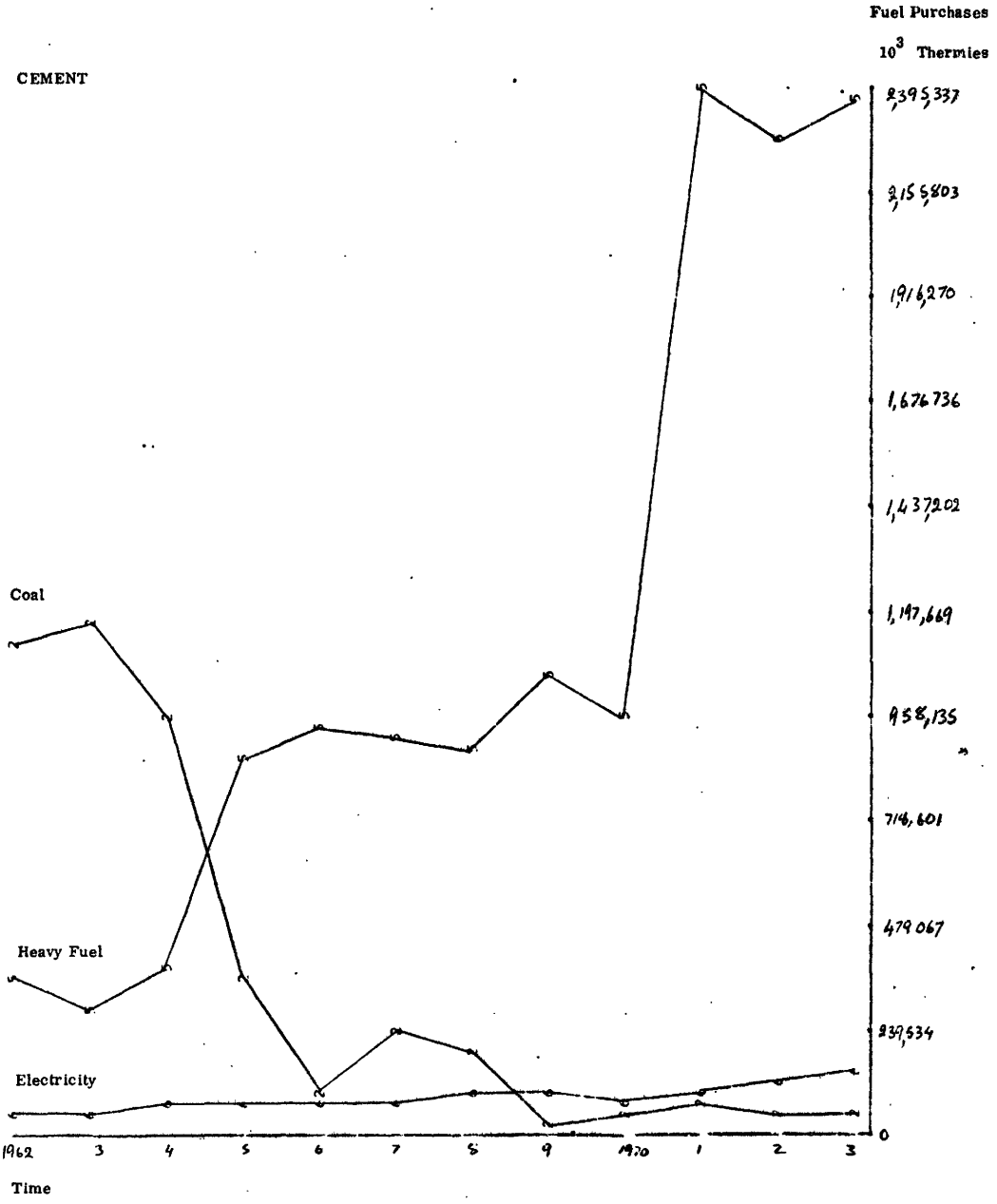


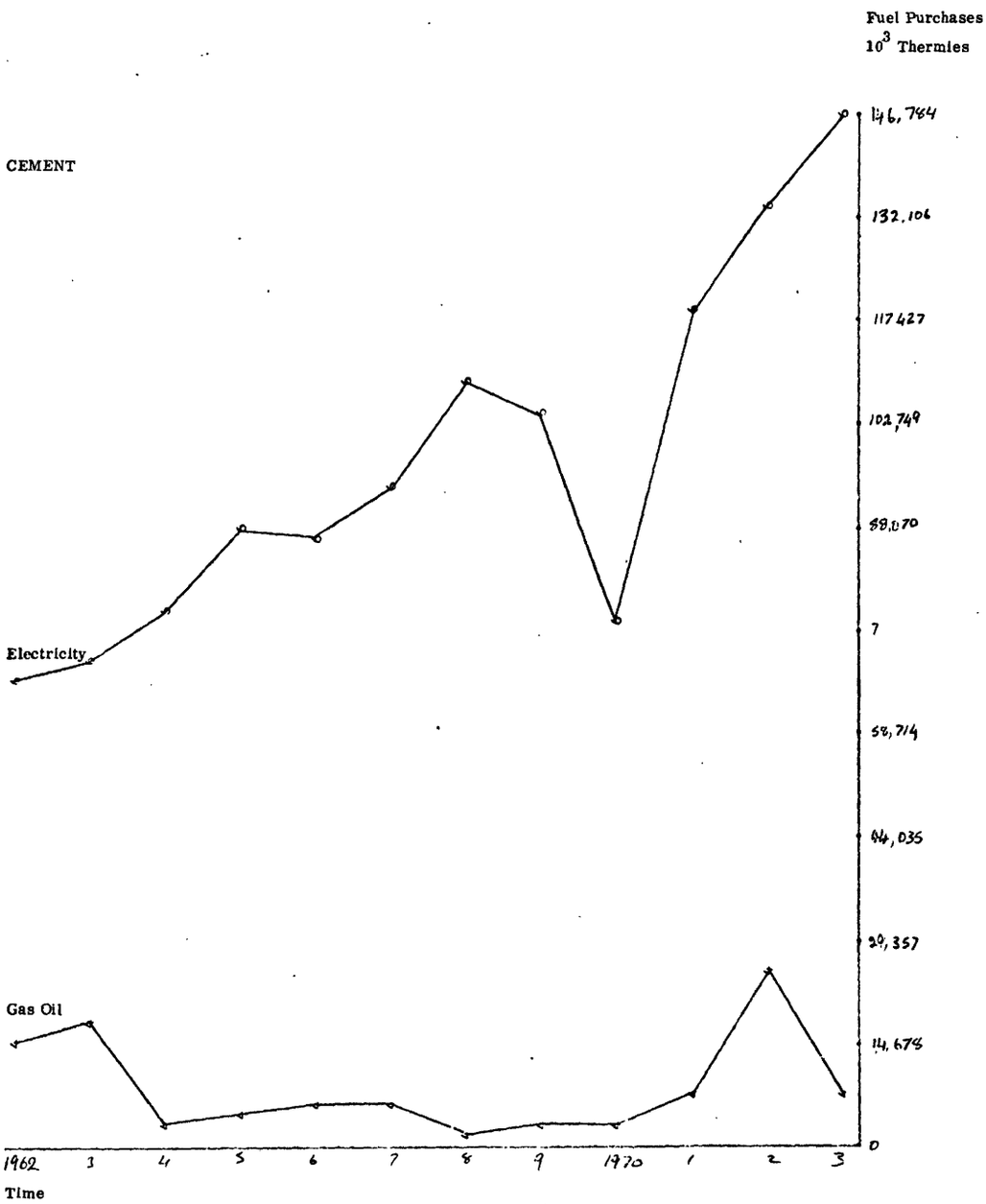
NON-FERROUS METALS


Fuel Purchases
10^3 Thermies
NON-FERROUS METALS
Gas
Coal
578
520
462
405
347
289
231
173
116
58
1969
3
4
5
6
7
8
9
1970
1
2
3
Time

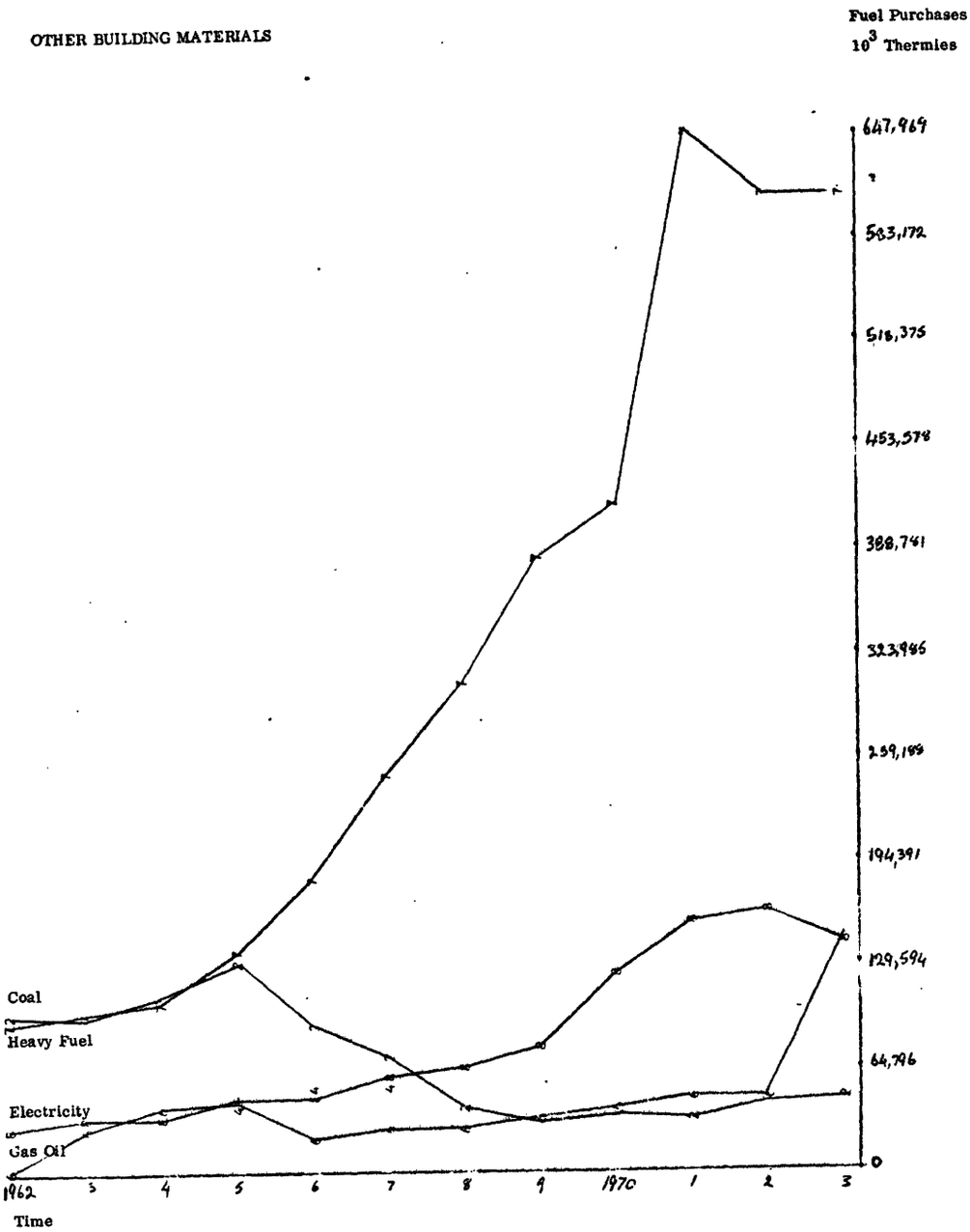

Glass
Fuel Purchases
10^3 Thermies
507,677
456,909
406,142
355,374
304,606
253,839
203,071
152,303
101,535
50,768
0
Heavy Fuels
Gas
Electricity
Gas Oil
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

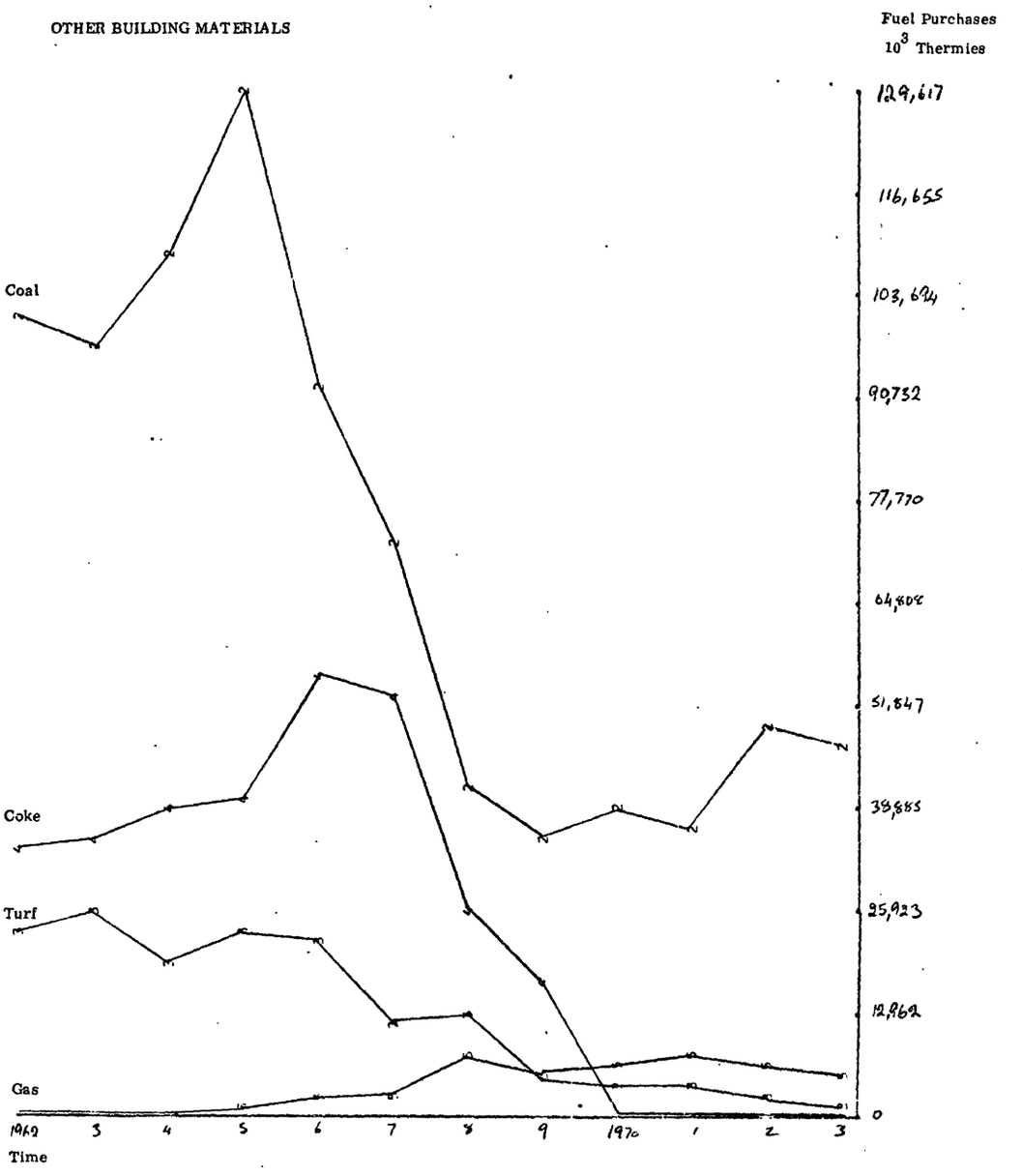

GLASS
Fuel Purchased
10^3 Thermies
15815
14233
12651
11070
9488
7907
6325
4744
3162
1581
0
Gas Oil
Coal
Coke
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

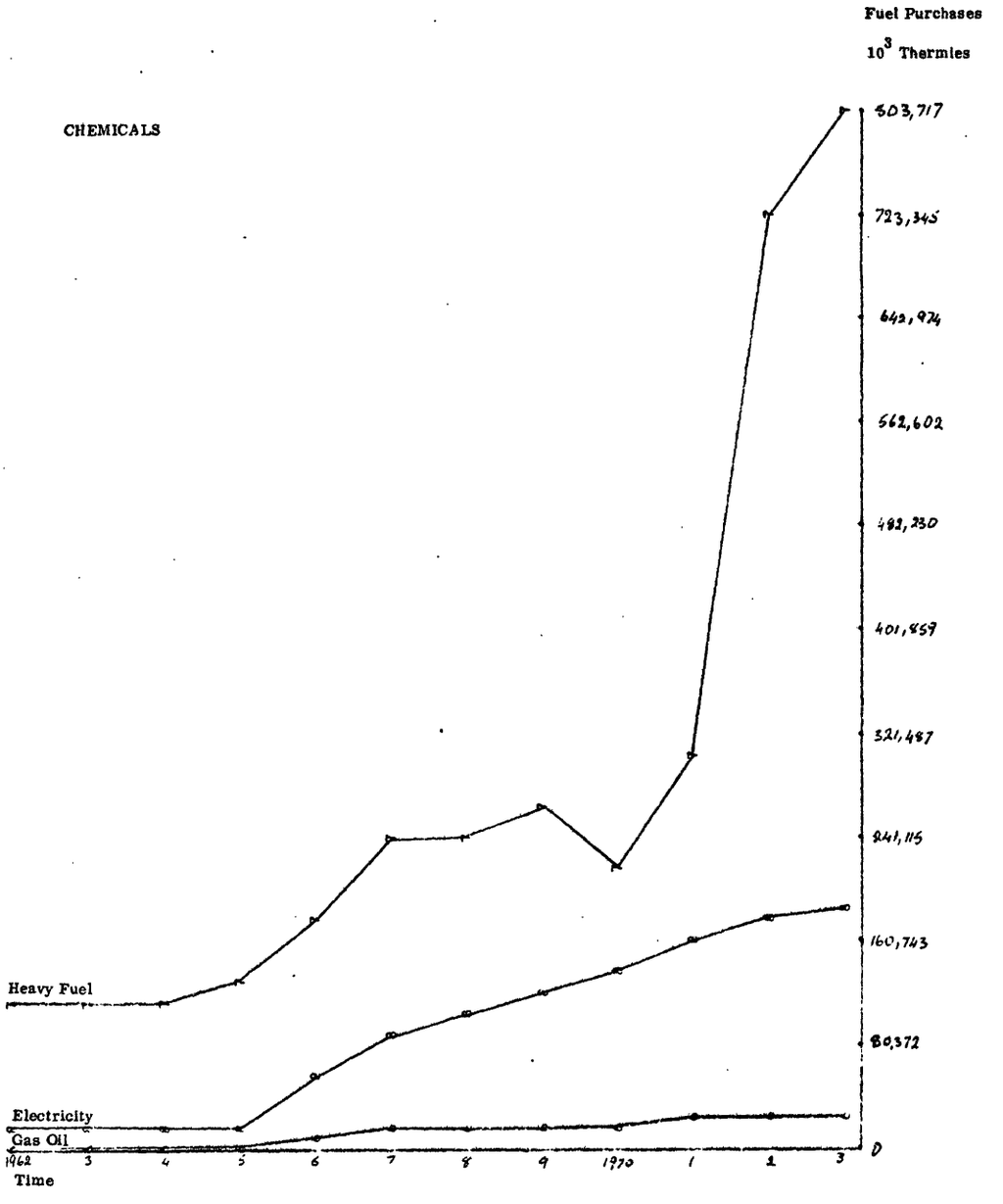

CEMENT
Fuel Purchases
10^3 Thermies
2,395,337
2,155,803
1,916,270
1,676,736
1,437,202
1,197,669
958,135
718,601
479,067
239,534
0
Coal
Heavy Fuel
Electricity
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

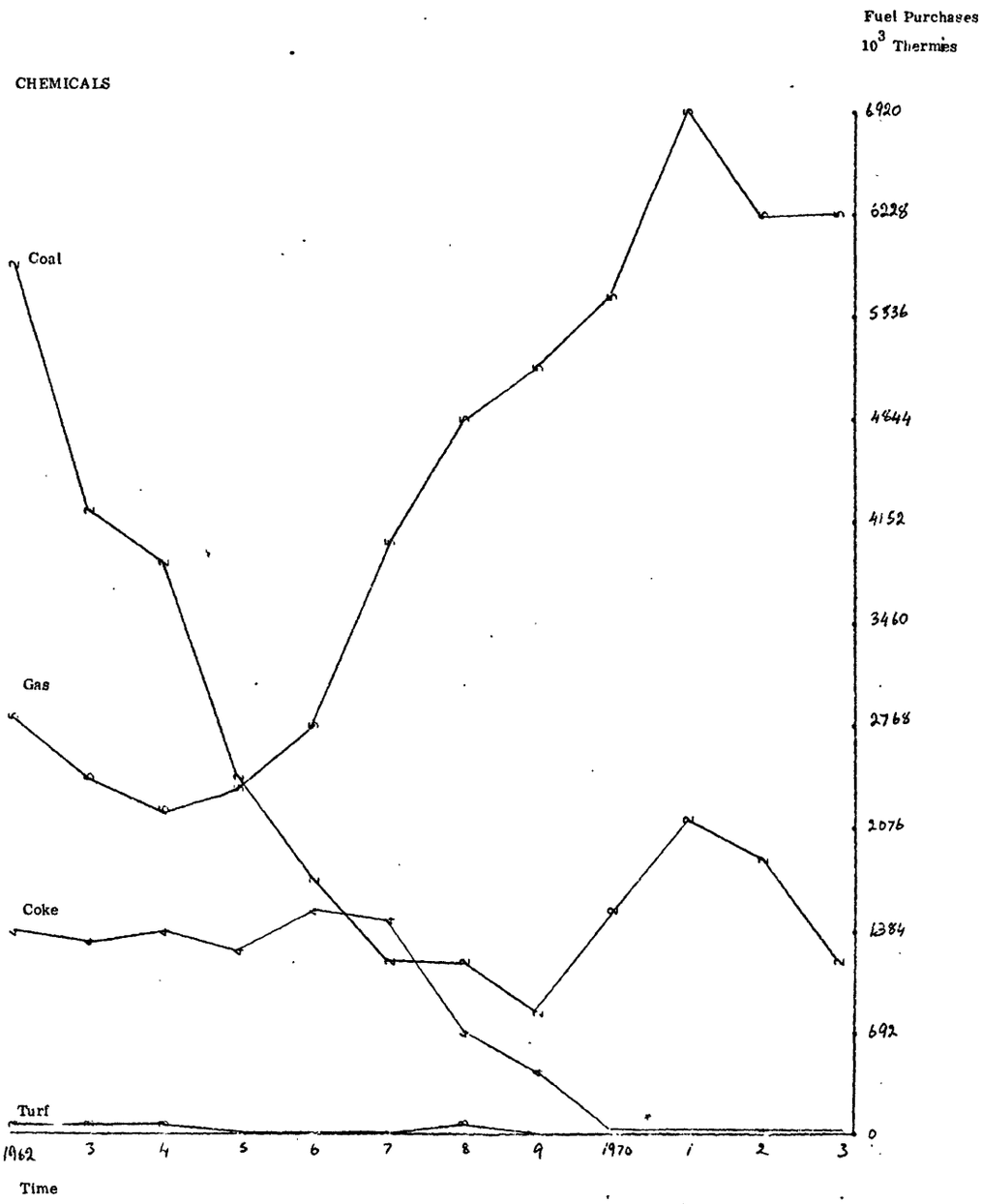

Fuel Purchases
10^3 Thermies
CEMENT
Electricity
Gas Oil
146,764
132,106
117,427
102,749
88,070
7
58,714
44,035
29,357
14,678
0
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

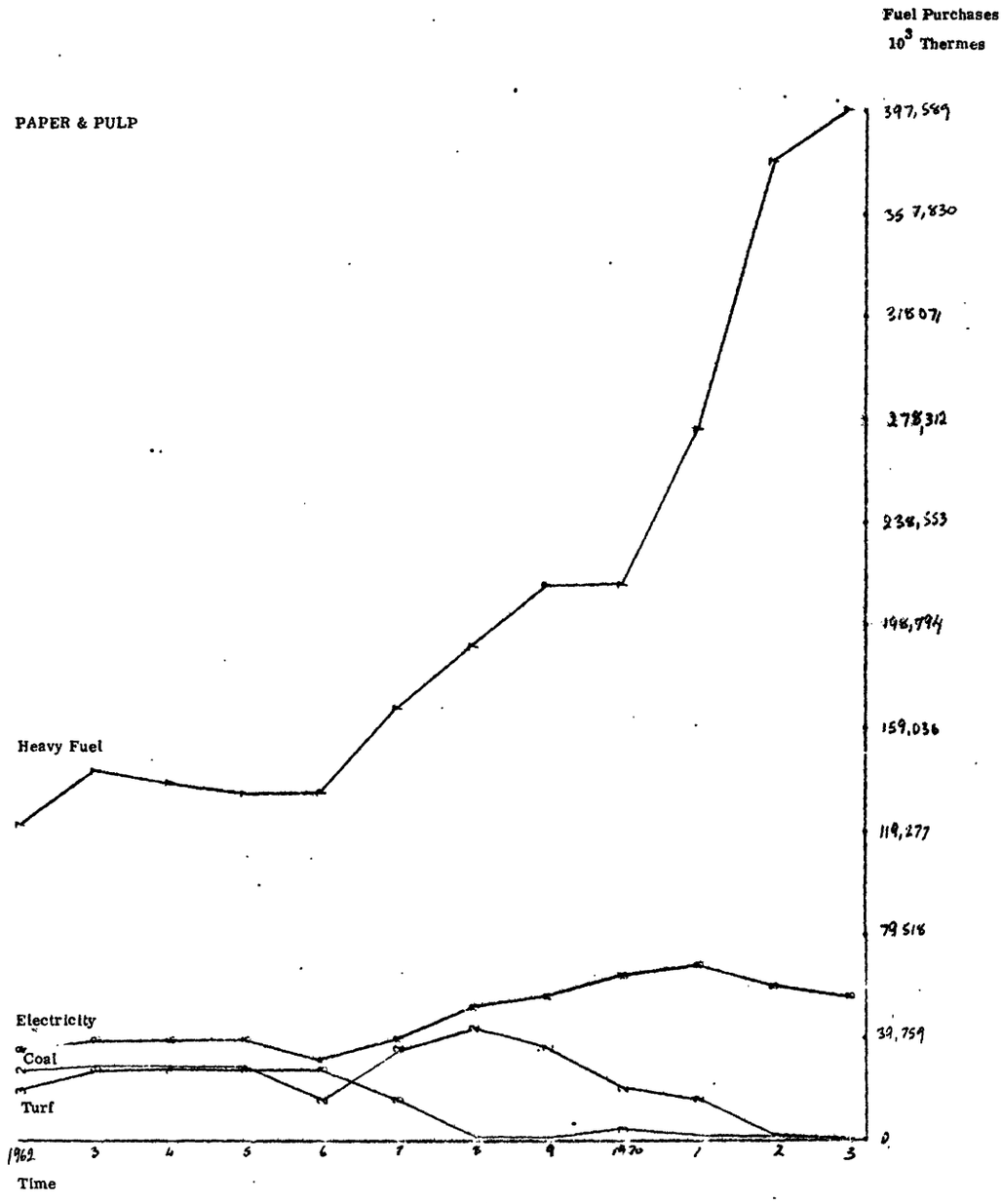
OTHER BUILDING MATERIALS



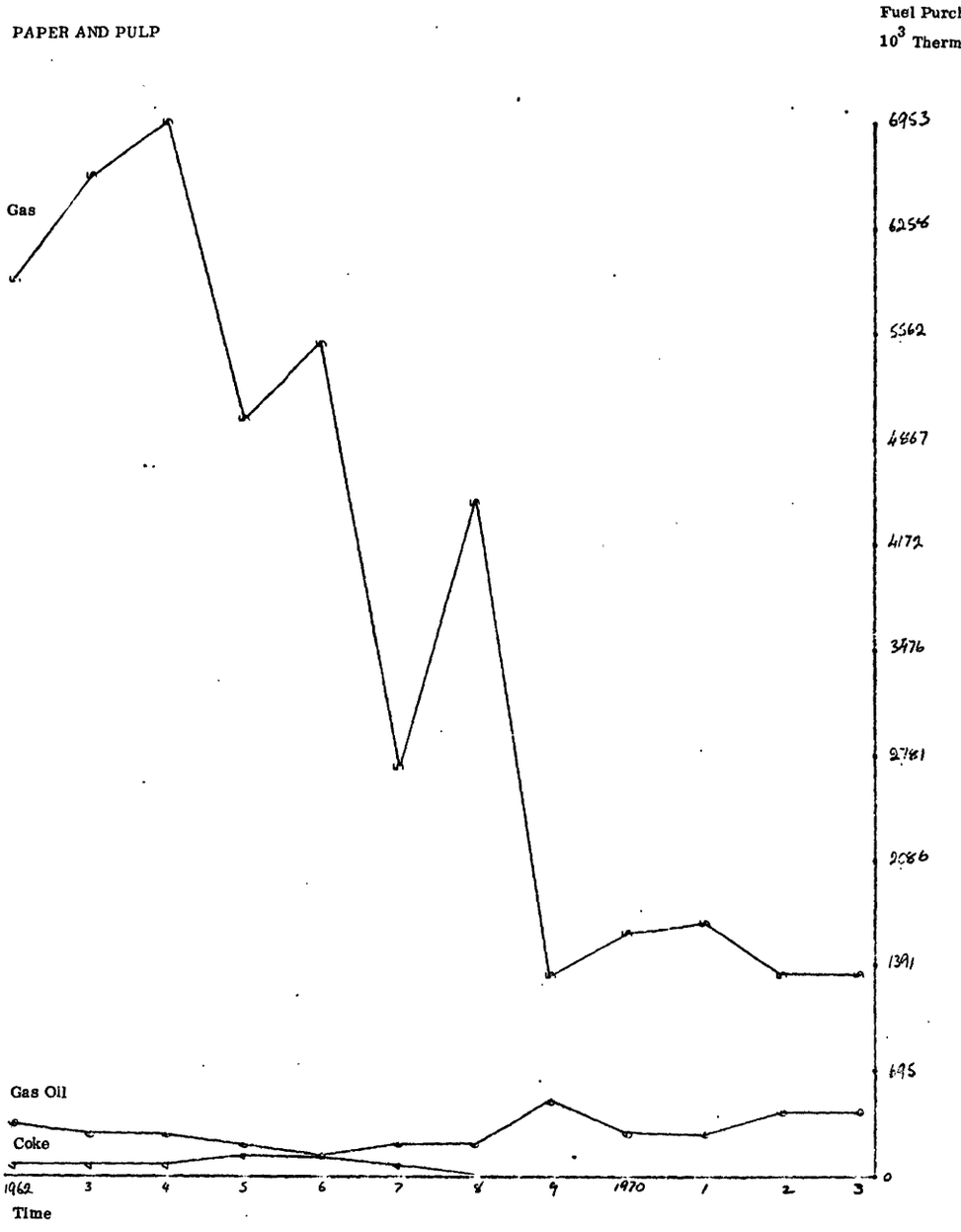

OTHER BUILDING MATERIALS
Fuel Purchases
10^3 Thermies
129,617
116,655
103,694
90,732
77,770
64,808
51,847
38,885
25,923
12,962
0
Coal
Coke
Turf
Gas
1969
3
4
5
6
7
8
9
1970
1
2
3
Time

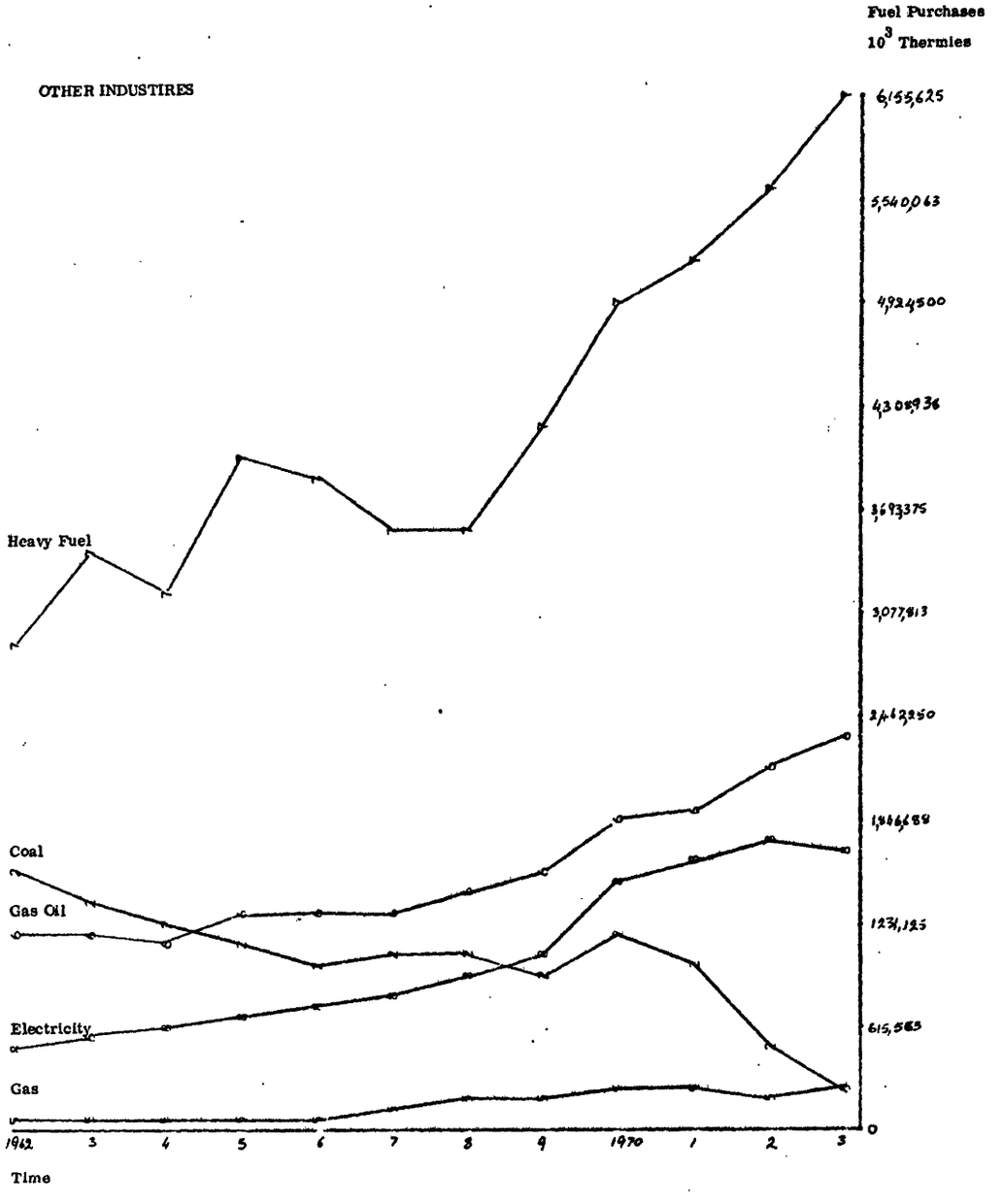

CHEMICALS
Fuel Purchases
10^3 Thermies
803,717
723,345
642,974
562,602
482,230
401,859
321,487
241,115
160,743
80,372
0
Heavy Fuel
Electricity
Gas Oil
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

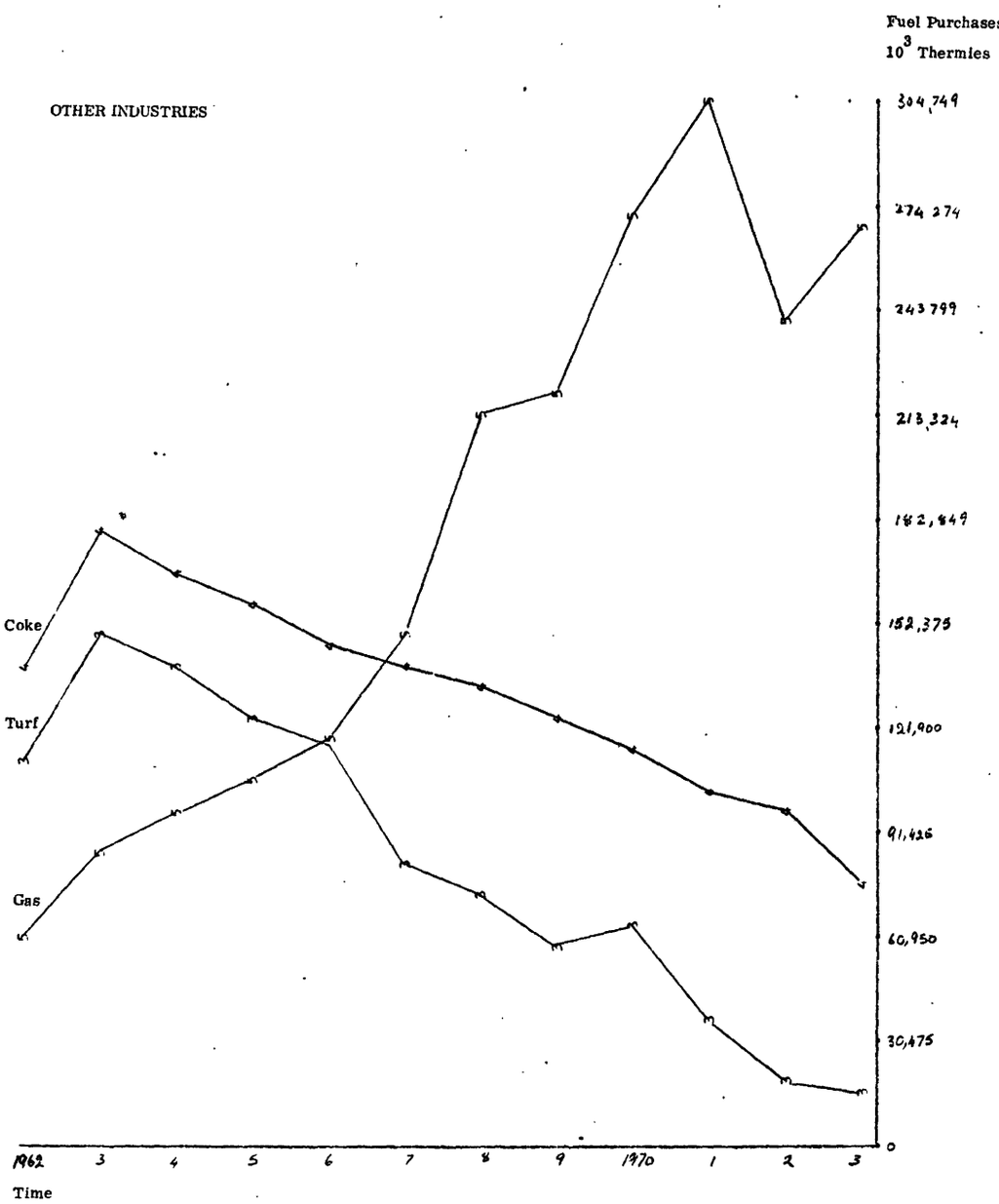

CHEMICALS
Fuel Purchases
10^3 Therms
Coal
Gas
Coke
Turf
6920
6228
5536
4844
4152
3460
2768
2076
1384
692
0
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

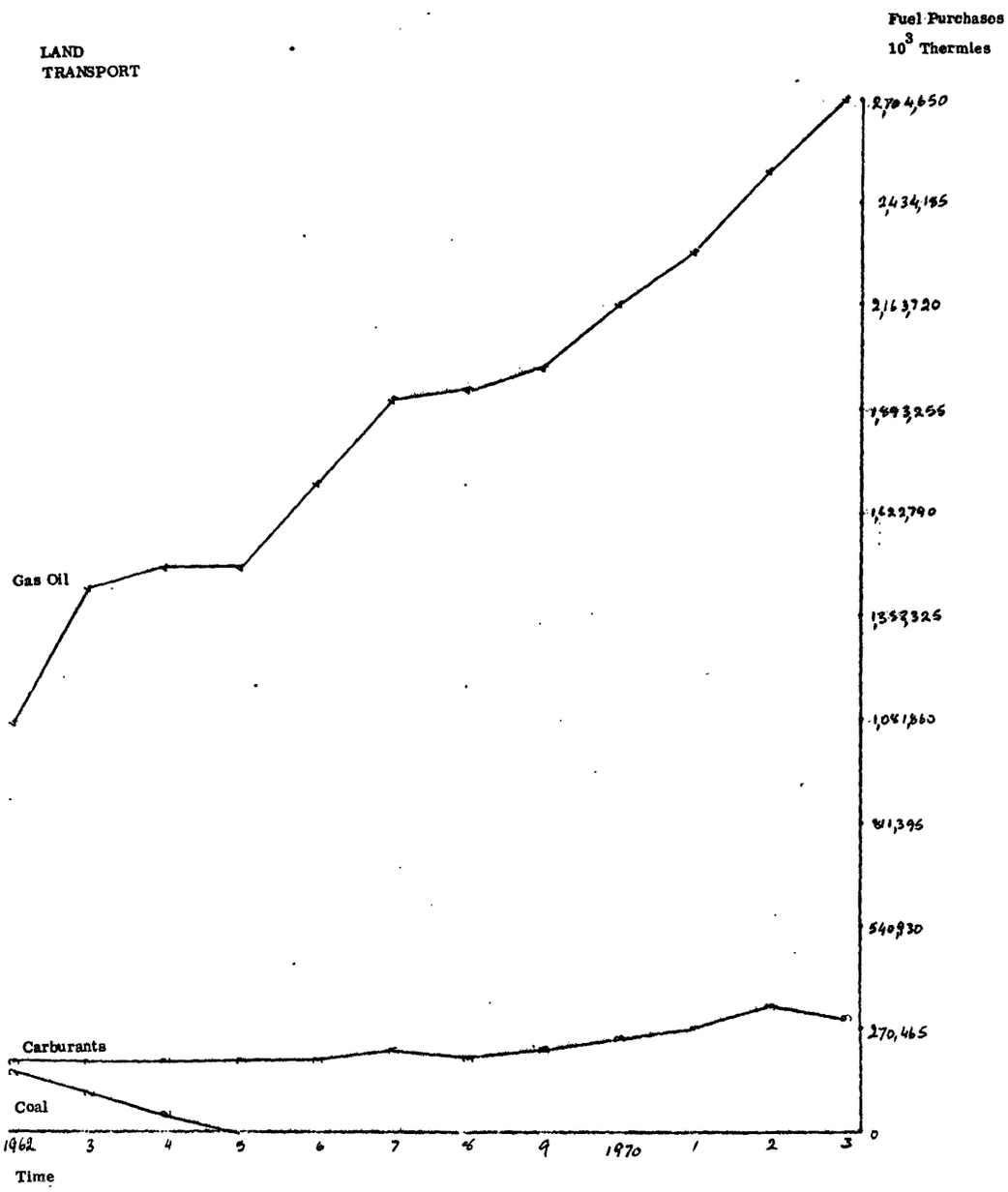

Fuel Purchases
10³ Thermes
PAPER & PULP
397,589
357,830
318071
278,312
238,553
198,794
159,036
119,277
79518
39,759
0
Heavy Fuel
Electricity
or Coal
Turf
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

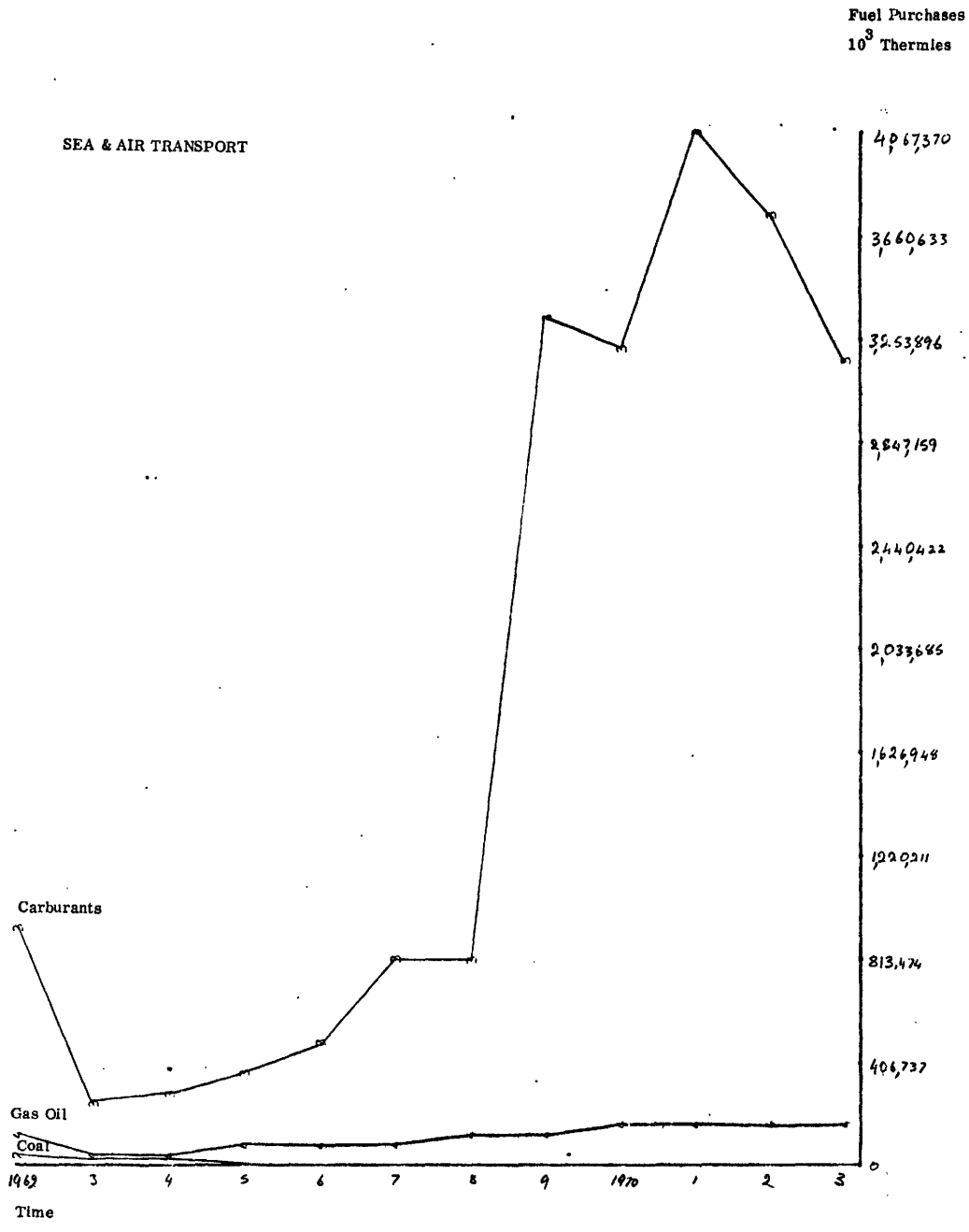
PAPER AND PULP



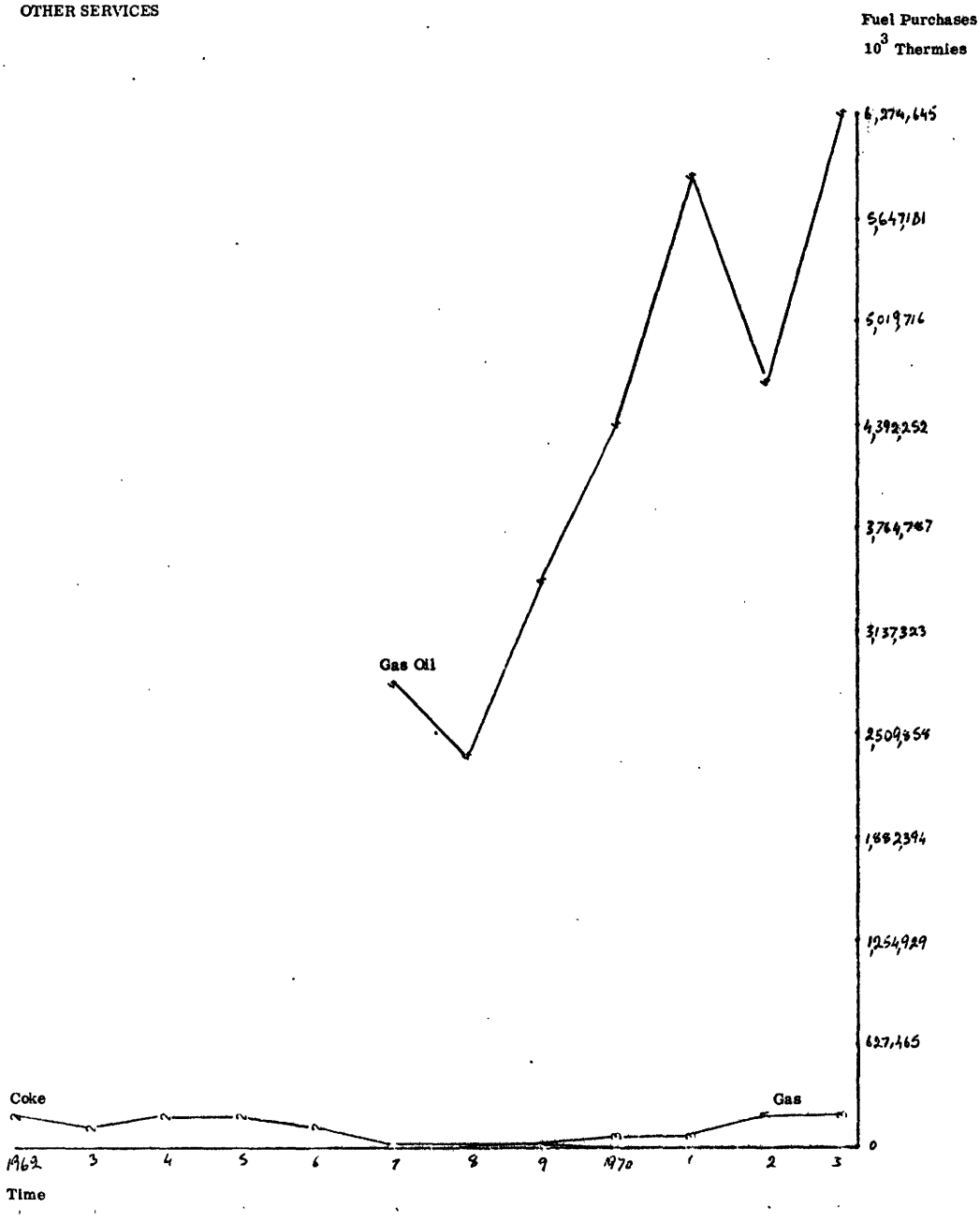

OTHER INDUSTIRES
Fuel Purchases
10^3 Thermies
6,155,625
5,540,063
4,924,500
4,308,936
3,693,375
3,077,813
2,462,250
1,846,688
1231,125
615,563
0
Heavy Fuel
Coal
Gas Oil
Electricity
Gas
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

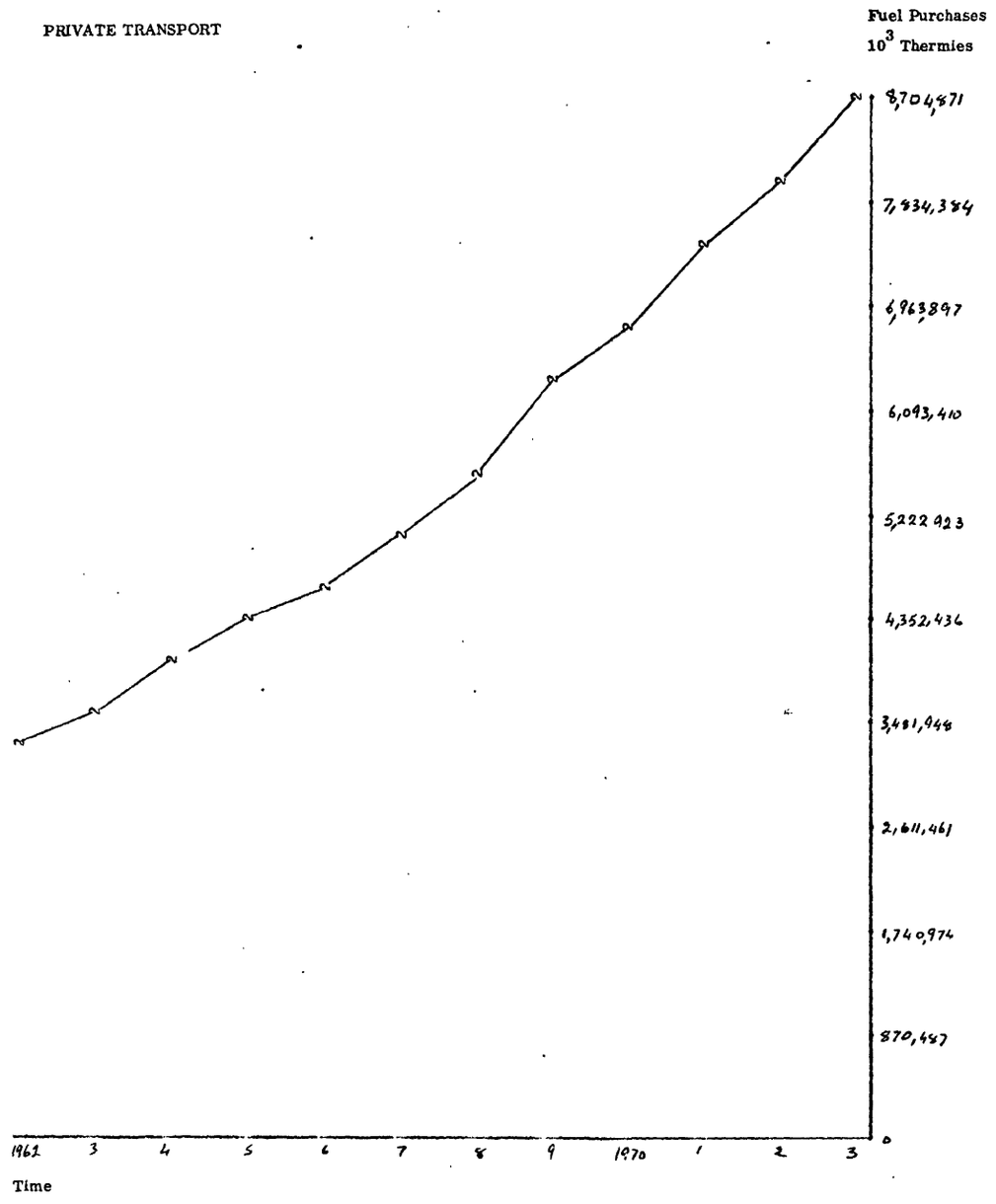

OTHER INDUSTRIES
Fuel Purchases
10^3 Thermies
304,749
274,274
243,799
213,324
182,849
152,375
121,900
91,426
60,950
30,475
0
Coke
Turf
Gas
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

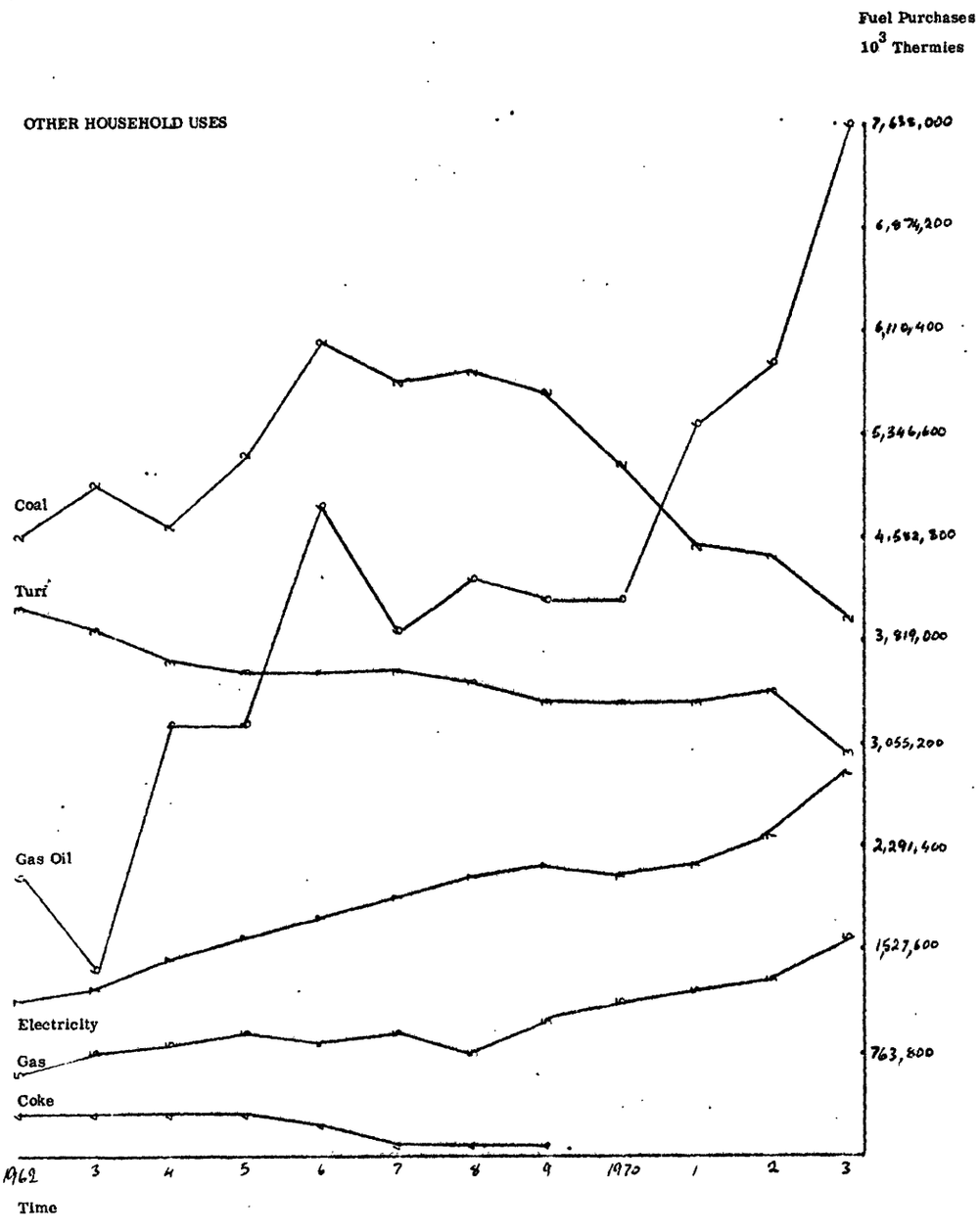

LAND
TRANSPORT
Fuel Purchases
10³ Thermies
2,704,650
2,434,185
2,163,720
1,893,255
1,622,790
1,352,325
1,081,860
811,395
540,930
270,465
0
Gas Oil
Carburants
Coal
1962
3
4
5
6
7
8
9
1970
1
2
3
Time


SEA & AIR TRANSPORT
Fuel Purchases
10^3 Thermies
4,067,370
3,660,633
3,253,896
2,847,159
2,440,422
2,033,685
1,626,948
1,220,211
813,474
406,737
0
Carburants
Gas Oil
Coal
1969
3
4
5
6
7
8
9
1970
1
2
3
Time

OTHER SERVICES




PRIVATE TRANSPORT
Fuel Purchases
10^3 Thermies
8,704,871
7,834,384
6,963,897
6,093,410
5,222,923
4,352,436
3,481,948
2,611,461
1,740,974
870,487
0
1962
3
4
5
6
7
8
9
1970
1
2
3
Time


Fuel Purchases
10^3 Thermies
OTHER HOUSEHOLD USES
7,658,000
6,874,200
6,110,400
5,346,600
4,582,800
3,819,000
3,055,200
2,291,400
1,527,600
763,800
Coal
Turf
Gas Oil
Electricity
Gas
Coke
1962
3
4
5
6
7
8
9
1970
1
2
3
Time

PARAMETERS

(e) Estimated Demand Relations

Listed here are the regression equations relating demand for fuels during 1962 to 1973 to various explanatory variables.

Given with the regression results are the values for adjusted R^2 and Durbin Watson test (D.W.). The t values are given in brackets below the relevant coefficients in the equation. These are unadjusted for degrees of freedom in the EAS computer package used, and need to be multiplied by 0.9128 or 0.866 in the case of one or two explanatory variables respectively.

Occasionally, there were better equations, in the statistical sense, than those given here, but which would have given quite implausible or negative projections. Instead, the best plausible equation had to be used. In any event there were frequently several equally good regressions from which to choose.

The reader is reminded that the variable codes are given on pages 8 and 9.

Energy Demand Relations: Iron & Steel (IS)

Demand for Gas Oil

$$DISGO = 4\,735.9 + 231.5\ GIS - 120.6\ \frac{PGO}{CPI}$$

(1.99) (2.26) (2.34)

Adj. R^2 =.83, D.W. = 2.99

Demand for Heavy Fuels

$$\ln DISHF = 9.54 + 0.20\ GIS$$

(20.65) (2.97)

Adj. R^2 = .37, D.W. = .71

Demand for electricity

$$\ln DISEL = 7.85 + 0.273\ GIS$$

(23.9) (5.8)

Adj. R^2 = .71, D.W. = 1.05

Demand for gas:

$$DISGA = 40757 - 207,038.9\ \frac{PGA}{CPI}$$

(11.13) (8.93)

Adj. R^2 = .86 D.W. 1.44

Demand for coke

$$DISCK = 47500.9 - 14699.87\ \ln CPI$$

(3.11) (2.42)

Adj. R^2 = 0.26 D.W. = 2.62

Average $\frac{DISCK}{GIS}$ = 1579.543

Demand for coal:

$$\text{Average } \frac{\text{DISCL}}{\text{GIS}} = 199.717$$

Demand for Turf:

$$\text{RDISTF} = \frac{\text{DISTF}}{\text{TDIS}} = .00634282 - 0.000474423 \text{ TIME} \qquad \text{OBS 3-12}$$

$$(4.59) \qquad (2.76)$$

$$\text{Adj. } R^2 = .36 \qquad \text{D.W.} = 2.53$$

$$\text{Average } \frac{\text{DISTF}}{\text{GIS}} = 30.9416 \qquad \text{OBS 3-12}$$

Total Demand for Fuel: OBS 9-12

$$\text{TDIS} = -234\ 959.6 + 194021.6\ ]\ \text{GIS}$$

$$(6.91) \qquad (11.91)$$

$$\text{Adj. } R^2 = .96 \qquad \text{D.W.} = 2.60$$

EFFICIENCY OBS 3-12

$$\frac{\text{GIS}}{\text{TDIS}} = 0.000134686 - 0.00000758833 \text{ TIME}$$

$$(13.14) \qquad (5.95)$$

$$\text{Adj. } R^2 = .75 \qquad \text{D.W.} = 1.46$$

Energy Demand Relations: Non-Ferrous Metals (NM)

Demand for electricity:

$$DNMEL = 44908.1 + 6029.2\ GNM - 49497.2\ \frac{PEL}{PHF}$$

(1.5) (13.68) (1.98)

Adj R^2 = .95 D.W. = 1.82

Demand for Heavy fuels:

$$\ln DNMHF = 5.32 + 1.72 \ln GNM$$

(10.6) (8.0)

Adj. R^2 = .83 D.W. = 1.58

Demand for coal:

$$DNMCL = -43.98 + 10.81\ GNM$$

(.73) (2.67)

Adj. R^2 = .83 D.W. = 1.85 (omitting 1st observation)

Demand for gas:

$$DNMGA = -7.81 + 10.46\ GNM$$

(.15) (3.02)

Adj. R^2 = .39 D.W. = 1.73

Demand for gas oil;

$$\ln DNMGO = 22.35578 - 0.427341\ \frac{PGO}{CPI}$$

(9.68) (6.25)

Adj. R^2 = .78 D.W. = 1.98

Total demand for fuels:

$$\ln TDNM = 7.304 + 1.5177\ \ln GNM$$

(28.9) (14.1)

Adj. R^2 = .94 D.W. = 2.39

EFFICIENCY

$$\ln \frac{GNM}{TDNM} = -7.806943 - 0.10953 \text{ TIME} \qquad \text{omit OBS 3}$$

(71.29) (7.64)

Adj. $R^2 = .82$ No. D.W.

Energy Demand Relations: Glass (GL)

Demand for electricity

$$DGLEL = 26870.3 + 3387.0\ GGL - 2272.7\ \frac{PEL}{CPI}$$

(1.64) (5.38) (2.04)

Adj. R^2 = .93 D.W. = 2.30

Demand for gas:

$$DGLGA = -163835.0 + 98981.53\ \ln GGL$$

(7.9) (10.2)

Adj. R^2 = .89 D.W. = 1.17

Demand for coke: the last 4 years, 1969 - 1973 are zero

Demand for coal

$$\frac{DGLCL}{TDGL} = 0.000233879 + 0.00986907\ \frac{1}{TIME}$$

(0.41) (6.32)

Adj. R^2 = 0.75 D.W. = 1.18

Demand for gas oil

$$\frac{DGLGO}{TDGL} = 0.0499786 - 0.00409722\ TIME$$

(8.41) (5.08)

Adj. R^2 = .65 D.W. = 2.11

Demand for heavy fuel

$$DGLHF = -64791.38 + 43649.08\ GGL$$

(0.96) (5.80)

Adj. $R^2 = .71$ D.W. = 1.09

Total Demand for Energy:

$$\ln TDGL = 11.62325 + 0.140481\ GGL$$

(76.57) (5.29)

Adj. $R^2 = .84$ D.W. = 1.06

EFFICIENCY

Unsatisfactory regression Adj. $R^2 = .26$

Energy demand relations: Cement

Demand for electricity:

$$\ln DCEEL = 10.9 + 0.109\ GCE - 0.03866\ \frac{PEL}{CPI}$$

(70.3) (15.4) (3.7)

Adj. R^2 = .98 D.W. = 2.28

Demand for heavy fuels:

$$\ln DCEHF = 9.66 + 1.4137\ \ln GCE - 1.6079\ \ln \frac{PHF}{PCL}$$

(13.86) (3.56) (4.36)

Adj. R^2 = .87 D.W. = 2.05

Demand for Coal:

$$\ln DCECL = 15.02 - 4.254\ \ln \frac{PCL}{PHF}$$

(28.3) (5.7)

Adj. R^2 = .71 D.W. = 1.79

Demand for gas oil:

$$DCEGO = -1230.9 + 747.357\ GCE$$

omit OBS

(0.45) (2.46) 1,2,11.

Adj. R^2 = 0.32 D.W. = not applicable

EFFICIENCY

$$\ln \frac{GCE}{TDCE} = -10.9543 - 0.124068\ TIME$$

OBS 7 to 12

(36.30) (3.97)

Adj. R^2 = .66 D.W. = 1.43

Energy demand relations: Other Building Materials (OB)

Demand for heavy fuels:

$$DOBHF = -151736 + 16593\ GOB$$

(3.96) (13.39)

Adj. R^2 = .93 D.W. = 1.17

Demand for electricity

$$\ln DOBEL = 12.490 + 0.0277892\ GOB - 0.206325\ \frac{PEL}{CPI}$$

Adj. R^2 = .93 D.W. = 1.40

Demand for gas:

$$DOBGA = -14688.40 + 5829.711 \ln GOB$$

(4.07) (5.32)

Adj. R^2 = 0.67 D.W. = 1.32

Demand for coal:

$$\ln DOBCL = 11.99087 - 1.368492 \ln \frac{PCL}{PHF}$$

(42.68) (3.48)

Adj. R^2 = .45 D.W. = 1.25

Demand for Turf:

$$\frac{DOBTF}{TDOB} = 00.858918 - 0.00797575\ TIME$$

(18.20) (12.44)

Adj. R^2 .92 D.W. 1.53

Demand for coke:

$$\frac{DOBCK}{TDOB} = 0.152151 - 0.0136415\ TIME$$

(11.8) (7.34)

Adj. R^2 = .80 D.W. = .97

Demand for gas oil:

$$DOBGO = 210238.6 - 72887.14 \frac{PGO}{PCL}$$

(4.40) (3.51)

Adj. R^2 = .46 D.W. = 1.75

Total Demand for fuels:

$$\ln TDOB = 12.25 + .0321209\ GOB$$

(209.51) (16.98)

Adj R = .96 D.W. = 1.52

EFFICIENCY

Unsatisfactory regression, Adj. R^2 = .46

Energy demand relations: Chemicals (CH)

Demand for Turf:

$$DCHTF = 258.26 - 137.85 \frac{PTF}{PHF}$$
$$(8.75) \quad (7.31)$$

Adj. $R^2 = .80$ D.W. = 2.12

Demand for Electricity:

$$DCHEL = -93482 + 3529.7\ GCH$$
$$(6.0) \quad (12.7)$$

Adj. $R^2 = .92$ D.W. = 1.62

Demand for Gas Oil:

$$DCHGO = -84612.9 + 25699.1 \ln GCH$$
$$(7.88) \quad (9.42)$$

Adj. $R^2 = .87$ D.W. = 1.46

Demand for Heavy Fuel:

$$DCHHF = -287884.1 + 10882.69 GCH$$
$$(2.73) \quad (5.78)$$

Adj. $R^2 = .1.71$ D.W. = 1.19

Demand for gas

$$DCHGA = -14083.54 + 4695.627 \ln GCH$$
$$(6.54) \quad (8.59)$$

Adj. R^2 .85 D.W. = 1.03

Demand for coal

$$DCHCL/TDCH = -0.000545448 + 0.045833 \frac{1}{TIME}$$
$$(0.29) \quad (8.76)$$

Adj. $R^2 = 0.85$ D.W. = 1.02

Demand for coke

Average DCHCK = 15.5 over last 4 years.

Total Demand for Fuel:

$$\ln TDCH = 10.79921 + 0.035836\ GCH$$

$$(63.53) \qquad (11.81)$$

$$\text{Adj. } R^2 = .91 \qquad \text{D.W.} = 2.17$$

EFFICIENCY

$$\frac{GCH}{TDCH} = 0.000244809 - 0.0000128363\ TIME$$

$$(17.59) \qquad (6.79)$$

$$\text{Adj. } R^2 = .77 \qquad \text{D.W. } 1.48$$

Energy Demand Relations: Paper and Pulp (PP)

Demand for Coal:

$$DPPCL = 148907.4 - 8178.6 \frac{PCL}{CPI}$$
$$(5.92) \qquad (4.94)$$

Adj. $R^2 = .64$ D.W. = 1.58

Demand for Turf:

$$DPPTF = 59789.35 - 30017.27 \frac{PTF}{PHF}$$
$$(4.62) \qquad (3.63)$$

Adj. $R^2 = .48$ D.W. = 1.30

Demand for Heavy Fuels:

$$\ln DPPHF = 11.5096 + 0.1636\ GPP - 0.5092 \ln \frac{PHF}{CPI}$$
$$(15.64) \quad (5.51) \quad (2.10)$$

Adj. $R^2 = .85$ D.W. = 1.64

Demand for gas:

$$RDPPGA = \frac{DPPGA}{TDPP} = 0.0320702 - 0.00272274\ TIME$$
$$(14.85) \quad (9.28)$$

Adj. $R^2 = 0.57$ D.W. = 2.47

Demand for coke:

DPPCK assume zero

Demand for gas oil:

$$\ln DPPGO = 2.8099 + 1.260233 \ln GPP$$
$$(2.79) \quad 2.92$$

Adj. $R^2 = .36$ D.W. = 1.77

Demand for electricity:

$$DPPEL = -11428.96 + 42760.88 \ln GPP - 3679.878 \frac{PEL}{CPI}$$

(0.33) (4.22) (2.81)

Adj. R^2 = .85 D.W. = .91

Total Demand for Fuels:

$$\ln TDPP = 11.24387 + 0.129381 GPP$$

(70.14) (8.55)

Adj. R^2 = .84 D.W. = 1.69

EFFICIENCY

$$\frac{GPP}{TDPP} = 0.0000408585 - 0.000000,881439 \ TIME$$

(25.39) (4.03)

Adj. R^2 = .53 D.W. = 1.99

Energy Demand Relations: Other Industries (OI)

Demand for Turf:

$$DOITF = 44078.4 - 1198186 \frac{PTF}{PGO}$$

(7.80) (6.5)

Adj. R^2 = .76 D.W. = 1.98

Demand for Coke:

$$DOICK/TDOI = 0.0276648 - 0.00163246 \ TIME$$

(25.71) (11.16)

Adj. R^2 = .90 D.W. = 1.27

Demand for Gas Oil:

$$\ln DOIGO = 7.8604 + 0.9483 \ln GOI - 0.6706 \ln \frac{PGO}{PCL}$$

(4.58) (4.43) (3.22)

Adj. R^2 = .95 D.W. = 2.00

Demand for Gas

$$DOIGA = -3622470 + 520439.8 \ln GOI$$

(9.67) (19.15)

Adj. R^2 = .89 D.W. = 1.23

Demand for Heavy Fuels:

$$DOIHF = -1563160 + 3664.572 \ GOI - 434820.3 \ln \frac{PHF}{PCL}$$

(0.4)

Adj. R^2 =.85 D.W. =1.28

Demand for electricity

$$DOIEL = -1171521 + 1208.971 \ GOI - 1059911 \ \ln \frac{PEL}{PCL}$$

(3.29) (3.56) (2.32)

Adj. R^2 = .95 D.W. 1.31

Demand for coal

$$\ln DOICL = 16.1975 \quad -5.39984 \quad \frac{PCL}{PGO}$$

(31.75) (4.82)

Adj. $R^2 = .62$ D.W. = 1.21

Total demand for fuel:

$$\ln TDOI = 14.78785 + 0.000\ 751\ 635\ GOI$$

(124.17) (9.6)

Adj. $R^2 = .87$ D.W. = 1.49

EFFICIENCY

Unsatisfactory regression

Energy Demand Relations: Land Transport (LT)

Demand for Gas/Oil (Diesel)

$$DLTGO = -3490529 + 71824.3\ GLT$$

(7.28) (11.28)

Adj. R^2 = .91 D.W. = 1.52

Demand for Carburants:

$$DLTCA = -177992.6 + 5567.383\ GLT$$

(2.30) (5.42)

Adj. R^2 = .68 D.W. = 1.21

Total Demand for fuel:

$$\ln TDLT = 3.795488 + 2.496582 \ln GLT$$

(3.50) (10.77)

Adj. R^2 = .90 D.W. = 1.61

EFFICIENCY

$$\frac{GLT}{TDLT} = 0.000\ 044\ 124\ 3 - 0.000\ 001\ 321\ 86\ \ TIME$$

(48.78) (10.76)

Adj. R^2 = .90 D.W. = 2.30

Demand for gas oil:

$$DSAGO = 15487.89 + 2542.712\ GSA$$

(0.76) (5.68)

Adj. $R^2 = .70$ D.W. = 1.26

Demand for Carburants:

$$DSACA = -3153985 + 113367.5\ GSA$$

(4.01) (6.53)

Adj. $R^2 = .76$ D.W. = 1.46

Total Demand for fuel

$$TDSA = -3,087,962 + 114,958.9\ GSA$$

(3.83) (6.46)

Adj. $R^2 = .75$ D.W. = 1.43

EFFICIENCY

$$\frac{GSA}{TDSA} = 0.000,094,489,2 - 0.000,007,630,35\ TIME$$

(14.12) (8.76)

Adj. $R^2 = .86$ D.W. = 1.27

Demand for Gas Oil:

$$DOSGO = -13898410 + 19647\ GOS$$

(9.71) (11.56)

$$Adj.R^2 = .91 \quad D.W. = 2.14$$

Demand for Gas:

$$DOSGA = -396780.7 + 533.99\ GOS$$

4.85 5.50

$$Adj.\ R^2 = .69 \quad D.W.\ 0.99$$

Demand for Coke:

DOSCK Assume O

Total Demand for fuel:

$$TDOS = -13,627,300 + 19,483.82\ GOS$$

(9.81) (11.81)

$$Adj.\ R^2 = .91 \quad D.W. = 2.15$$

EFFICIENCY

$$\log \frac{GOS}{TDOS} = -4.535716 - 0.402996\ TIME$$

(9.62) (6.56)

$$Adj.\ R^2 = .77 \quad D.W. = 1.71$$

Energy Demand Relations — Private Transport (PT)

Demand for carburants

$$DPTCA = 65688010 - 25178.26 \frac{PCA}{CPI} + 10641550 \ln HHC$$

(7.81) (1.63) (10.56)

Adj. $R^2 = .99$ D.W. = 1.75

or:

$$DPTCA = -70,947,720 + 202545500 \frac{}{PCA/CPI} + 10,744,000 \ln HHC$$

(14.67) (1.85) (12.69)

Adj. $R^2 = .99$ D.W. = 1.76

Energy Demand Relations: Other Household (OH)

Demand for Coal:

$$DOHCL = -19016460 + 4313642 \ell n\ HHC - 12949920 \frac{PCL}{PGO}$$
$$(1.48) \quad (2.07) \quad (3.20)$$

Adj. $R^2 = .50$ D.W. = 1.90

Demand for Turf:

$$DOHTF = 3105586 + 452\ TEMPD - 18508 \frac{PTF}{PGA}$$
$$(3.18) \quad (2.50) \quad (4.00)$$

(Ave TEMPD = 4115)

Adj. $R^2 = .75$ D.W. = 1.97

or

$$DOHTF = 3301721 + 494\ TEMPD - 5126479 \frac{PTF}{PGO}$$
$$(3.43) \quad (2.95) \quad (4.26)$$

Adj. $R^2 = .77$ D.W. = 2.47

or

$$DOHTF = 3104558 + 463\ TEMPD - 1253849 \frac{PTF}{PEL}$$
$$(2.91) \quad (2.41) \quad (3.59)$$

(We used the average of these)

Adj. $R^2 = .72$ D.W. = 2.18

Demand for Gas Oil:

$$DOHGO = -5866529 + 9690HHC$$
$$(3.77) \quad (6.53)$$

(We used this one)

Adj. $R^2 = .76$ D.W. = 1.43

or

$$DOHGO = 54,452,500 - 14,262,350 \ln \frac{PGO}{CPI}$$

(6.53) (6.03)

Adj. $R^2 = .73$ D.W. = 1.58

Demand for Coke

$$\frac{DOHCK}{TDOH} = 0.0457432 - 0.0177012 \frac{PCK}{PEL} - 0.00191704 \text{ TIME}$$

(5.37) (2.15) (6.12)

Adj. $R^2 = .91$ D.W. = 1.12

Demand for gas

$$DOHGA = -8356573 + 724372.9 \ln HHC - 953545.2 \ln \frac{PGA}{PCL}$$

(6.59) (2.36) (3.85)

Adj. $R^2 = 0.93$ D.W. = 2.12

Demand for Electricity

$$\ln DOHEL = 9.56683 + 0.85637 \ln HHC - 1.196508 \frac{PEL}{PTF}$$

(5.66) (4.02) (4.34)

Adj. $R^2 = 0.94$ D.W. = 2.14

Total demand for fuel:

$$TDOH = 3\text{]} 478490 + 6229.594 HHG - 238489.4 P$$

(2.93) (2.63) (2.46)

Adj. $R^2 = 0.72$ D.W. = 1.41

EFFICIENCY

Unsatisfactory regression

(f) Projected explanatory variables and assumptions

These are the explanatory variables which were substituted into the demand equations of section (e) to give the energy projection in section (g)

Gross Outputs (£m 1970 prices)	1980	1985
Iron and steel	11.74	13.04
Non-ferrous metals	44.40	49.51
Glass	22.36	27.40
Cement	20.41	25.02
Other Building Materials	86.48	105.99
Chemicals	340.82	416.72
Paper and pulp	22.26	24.11
Other industries	3871.56	4766.29
Land transportation	119.98	142.87
Sea and air transport	69.74	79.90
Other services	1539.01	2012.6
Private transport	Not applicable	Not applicable
Other household consumption	1915.80	2314.32

Source:
These figures were obtained by applying to 1973 the average annual assumed growth rates for 1969/80 and 1969/85 as given in Part 1.

Fuel Prices

These are 'real' prices, equivalent to the price charged deflated by the CPI.

These real price projections were suggested as possibilities by the National Science Council.

	1980	1985
Coal £ per tonne	28.6608	36.4773
Turf " " "	9.8265	12.5065
Coke " " "	17.9223	21.4397
Gas (incl.LPG) per therm	0.1668	0.1980
Carburants per tonne	180.1534	245.6637
Gas Oil, Dom. fuel oil per tonne	38.7106	61.9370
Heavy fuel oil per tonne	17.8664	28.5863
Electricity per 1000 kwh	11.5387	14.4234
Consumer Price Index (CPI) (1970 = 100, ESRI forecast)	3.1190	4.2133
Price of fuel and light deflated by CPI = (P)	118.65	162.35

(g) Projection of Energy Demand

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

IRON AND STEEL

	Actual 1973	1980	1985
Coal	480	2345	2604
Turf	124	0	0
Coke	8319	5076	2442
Gas	15143	6223	0
Carburants	-	-	-
Gas oil /Dom.f.oil	3642	2785	285
Heavy fuels	145 410	145 510	188 716
Electricity	47 640	63 261	90 212
Total Energy	220 758	225 205	284 259
Gross Output (£m 1970 prices)	10.19	11.74	13.04
Implicit Energy Intensity (Energy/Output)	21 664	19 183	21 799

NOTES:

Coal is simply the average $\frac{\text{DISCL}}{\text{GIS}}$ applied to 1980 and 1985 GIS.

The gas and gas oil declines are due to 'price' being significant explanatory variables, and to the high projected prices used here. Turf could only be explained by a time trend.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

NON-FERROUS METALS

	Actual 1973	1980	1985
Coal	412	436	491
Turf	-	-	-
Coke	-	-	-
Gas	354	457	510
Carburants	-	-	-
Gas oil /Dom.f.oil	45 285 (1972 was 4 400)	335	0
Heavy fuels	38 224	139 298	168 003
Electricity	114 018	280 637	318 439
Total Energy	198 293	421 163	487 443
Gross Output (£m 1970 prices)	20.97	44.40	49.51
Implicit Energy Intensity (Energy/Output)	9456	9486	9845

NOTES:

The gas oil decline is due to 'price' being the only significant explanatory variable, and due to the high projected price rise used here.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

GLASS

	Actual 1973	1980	1985
Coal	441	853	847
Turf	10	-	-
Coke	-	-	-
Gas	72 655	143 727	163 847
Carburants	-	-	-
Gas oil /Dom.f.oil	3 736	0	0
Heavy fuels	429 005	911 201	1 131 192
Electricity	50 514	76 379	86 894
Total Energy	556 361	1 132 160	1 382 825
Gross Output (£m 1970 prices)	13.34	22.36	27.40
Implicit Energy Intensity (Energy/Output)	41 705	50 633	50 468

NOTES:

The ratio of gas oil to total energy could only be explained by a negative time trend, which makes gas oil zero by the 13th year. Coal could also only be explained by a time trend.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

CEMENT

	Actual 1973	1980	1985
Coal	67 137	446 647	1182 374
Turf	-	-	-
Coke	-	-	-
Gas	-	-	-
Carburants	-	-	-
Gas oil /Dom.f.oil	8 717	14 023	17 467
Heavy fuels	2 377 744	2 382 492	2 199 183
Electricity	146 784	320, 809	474 287
Total Energy	2 600 382	3 163 971	3 873 311
Gross Output (£m 1970 prices)	12.18	20.41	25.02
Implicit Energy Intensity (Energy/Output)	213 496	155 021	154 809

NOTES:

Coal and Heavy Fuel Oil are substitutes

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

OTHER BUILDING MATERIALS

	Actual 1973	1980	1985
Coal	46 832	84 466	115 530
Turf	1 839	0	0
Coke	545	0	0
Gas	5 210	11 312	12 498
Carburants	-	-	-
Gas oil /Dom.f.oil	145 610	111 794	86 479
Heavy fuels	614 785	1 283 226	1 606 955
Electricity	143 183	271 606	257 580
Total Energy	958 004	1 762 404	2 079 042
Gross Output (£m 1970 prices)	51.6	86.48	105.99
Implicit Energy Intensity (Energy/Output)	18 566	20 379	19 615

NOTES:

Gas oil consumption is affected by the price of gas oil relative to the price of coal. Turf could only be explained by a time trend, as also coke.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

CHEMICALS

	Actual 1973	1980	1985
Coal	1 245	8 749	7 934
Turf	24	182	198
Coke	14	16	16
Gas	6 285	13 298	14 242
Carburants	-	-	-
Gas oil /Dom.f.oil	26 026	65 248	70 415
Heavy fuels	803 717	3 421 150	4 247 148
Electricity	191 235	1 109 509	1 377 414
Total Energy	1 028 546	4 618 152	5 717 367
Gross Output (£m 1970 prices)	90.7	340.82	416.72
Implicit Energy Intensity (Energy/Output)	1 134	13 550	13 720

NOTES:

The heavy fuels equation is exponential, and there was a sharp rise in electricity 1965 to 1973, hence the large rises projected for these two fuels.

Coal could only be explained by a time trend

Projections 1980 and 1985 (Based on time series regressions for 1962 to 1973)

10^3 Thermies

PAPER & PULP

	Actual 1973	1980	1985
Coal	134	0	0
Turf	787	43 280	46 657
Coke	-	-	-
Gas	1 381	0	0
Carburants	-	-	-
Gas oil /Dom.f.oil	459	829	917
Heavy fuels	397 589	876 201	933 487
Electricity	59 374	78 788	71 587
Total Energy	459 724	999 098	1 052 648
(When projecting efficiency (R^2 = .53))		(923 224)	(1 223 610)
Gross Output (£m 1970 prices)	13.44	22.26	24.11
Implicit Energy Intensity (Energy/Output)	34 206	44 883	43 660

NOTES:

Gas consumption could only be explained by a time trend. The turf rise is explained by its projected price decline relative to that of heavy fuels; note, however, that in 1965 consumption was 29 200.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

OTHER INDUSTRIES

	Actual 1973	1980	1985
Coal	251 517	198 695	450 135
Turf	16 922	189 925	252 137
Coke	78 362	0	0
Gas	270 698	677 097	785 302
Carburants	-	-	-
Gas oil /Dom.f.oil	2 393 481	5 352 771	5 591 859
Heavy fuels	6 155 625	12 829 950	16 244 010
Electricity	1 703 414	4 473 415	5 574 211
Total Energy	10 870 019	23 721 853	2 889 768
Gross Output (£m 1970 prices)	1920.4	3872	4766
Implicit Energy Intensity (Energy/Output)	5660	6127	6063

NOTES:

The demand for turf in 1963 was 151 983

Coke could only be explained by a time trend

Coal depends on its price relative to that of gas oil

Electricity depends on its price relative to that of coal as well as on gross output

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

SEA AND AIR TRANSPORT

	Actual 1973	1980	1985
Coal			
Turf			
Coke			
Gas			
Carburants	3 183 630	4 752 364	5 904 178
Gas oil /Dom.f.oil	164 250	192 817	218 651
Heavy fuels			
Electricity			
Total Energy	3 347 880	4 945 181	6 122 829
Gross Output (£m 1970 prices)	64.1	69.74	79.90
Implicit Energy Intensity (Energy/Output)	52 229	70 909	76 631

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

LAND TRANSPORT

	Actual 1973	1980	1985
Coal			
Turf			
Coke			
Gas			
Carburants	307 849	489 982	617 419
Gas oil /Dom.f.oil	2 704 650	5 126 944	6 771 001
Heavy fuels			
Electricity			
Total Energy	3 012 499	5 616 926	7 388 420
Gross Output (£m 1970 prices)	88.5	119.98	142.87
Implicit Energy Intensity (Energy/Output)	34 040	46 816	51 714

NOTES:

In fact the best fitting regression, relating carburants to their price, gives negative consumption by 1980.

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

OTHER SERVICES

	Actual 1973	1980	1985
Coal			
Turf			
Coke			
Gas	201 024	414 765	658 991
Carburants			
Gas oil /Dom.f.oil	6 274 645	15 943 709	24 926 315
Heavy fuels			
Electricity			
Total Energy	6 475 669	16 358 474	25 585 306
Gross Output (£m 1970 prices)	1033.6	1539.01	2012.6
Implicit Energy Intensity (Energy/Output)	6 265	10 629	12 713

NOTES:

The equation for gas had an R^2 of only 0.69

The demand for gas oil is only explained by gross output

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

PRIVATE TRANSPORT

	Actual 1973	1980	1985
Coal			
Turf			
Coke			
Gas			
Carburants	8 704 871	11 378 560	13 109 152
Gas oil /Dom.f.oil			
Heavy fuels			
Electricity			
Total Energy	8 704 871	11 378 560	13 109 152
Household Consumption (£m 1970 prices)	1301.0	1915.8	2314.32
Implicit Energy Intensity (Energy/ consumption)	6 691	5 939	5 664

Projections 1980 and 1985 (based on time series regressions for 1962 to 1973)

10^3 Thermies

OTHER HOUSEHOLD USES

	Actual 1973	1980	1985
Coal	4 025 152	3 997 630	6 774 017
Turf	3 007 794	3 950 132	4 006 152
Coke	46 760	0	0
Gas	1 620 850	2 025 569	2 228 912
Carburants			
Gas oil /Dom.f.oil	7 638 000	12 697 567	16 559 215
Heavy fuels			
Electricity	2 832 838	2 267 479	2 733 537
Total Energy	19 171 394	24 938 377	32 301 830
Household Consumption (£m 1970 prices)	1301.0	1915.8	2314.32
Implicit Energy Intensity (Energy/consumption)	14 736	13 017	13 957

NOTES:

Coal is only explained by its price, not relative to price(s) of competing fuels. Coke is mainly explained by a time trend. Gas is only explained by Household Consumption and not price, similarly for gas oil. Electricity is affected by the short run drastic relative decline in the price of turf.

(h) 1973

10^3 Thermies

		Iron & Steel	Non-ferrous Metals	Glass	Cement	Other Building Materials	Chemicals	Pulp & Paper	Other Industries	Land Transportation	Sea, Air Transportation	Other Services	Private Transportation	Other household uses (inc. heating)	Total
1 (a)	Coal	480	412	441	67 137	46 832	1 245	134	257 517	0	0			4 025 152	4 393 350
1 (b)	Turf	124		10		1 839	24	787	16 922					3 007 794	3 027 500
2	Coke	8 319	0	0	0	545	14	0	78 362			0		46 760	134 000
3	Gas	15 143	354	72 655		5 210	6 285	1 381	270 698			201 024		1 620 850	2 193 600
4	Carburants									307 849	3 183 630		8 704 871		12 196 350
5	Gas oil/dom. fuel oil (incl. diesel)	3 642	45 285	3 736	8 717	145 610	26 026	459	2 393 481	2 704 650	164 250	6 274 645		7 638 000	19 408 501
6	Heavy Fuels	145 410	38 224	429 905	2 377 744	614 785	803 717	397 589	6 155 625						10 962 099
7	Naphtas														
8	Hydrogen														
9	Electricity	47 640	114 018	50 514	146 784	143 183	191 235	59 374	1 703 414					2 832 838	5 289 000
		220 758	198 293	556 361	2 600 382	958 004	1 028 546	459 724	10 870 019	3 012 499	3 347 880	6 475 669	8 704 871	19 171 394	57 604 400
Gross Output (£m 1970)		10.19	20.97	13.34	12.18	51.6	90.7	13.44	1920.4	88.5	64.1	1033.6	(1301.0)	1301.0	(3319.02)
Implicit Intensity (k thermies / £m)		21 664	9 456	41 705	213.496	18 566	1 134	34 206	5 660	34 040	52 229	6 265	6 691	14 736	(17 356)

(h) 1980

10^3 Thermies

	Iron & Steel	Non-ferrous Metals	Glass	Cement	Other Building Materials	Chemicals	Pulp & Paper	Other Industries	Land Transportation	Sea, Air Transportation	Other Services	Private Transportation	Other household uses (inc. heating)	Total
1(a) Coal	2 345	436	853	446 647	84 466	8 749	-	198 695	-	-	-	-	3. 997 630	
1(b) Turf	-	-	-	-	-	182	43 280	189 925	-	-	-	-	3, 950, 132	
2 Coke	5 076	-	-	-	-	16	-	-	-	-	-	-	-	
3 Gas	6 223	457	143 727	-	11 312	13 298	-	677 097	-	-	414 765	-	2 025 569	
4 Carburants	-	-	-	-	-	-	-	-	489 982	4 752 364	-	11 378 560	-	
5 Gas oil/dom. fuel oil (incl. diesel)	2 785	335	-	14 023	111 794	65 248	829	5 352 771	5 126 944	192 817	15 943 709		12 697 567	
6. Heavy fuels	145 510	139 298	911 201	2 382 492	1 283 226	3 421 150	876 201	12 829 950	-	-	-	-	-	
7. Naphtas	-	-	-	-	-	-	-	-	-	-	-	-	-	
8. Hydrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	
9 Electricity	63 261	280 637	76 379	320 809	271 606	1 109 509	78 788	4 473 415	-	-	-	-	2 267 479	
	225 205	421 163	1 132 160	3 162. 971	1 762,404	4 618 152	999 098	23 721 853	5 616 926	4 945 181	16 358.474	11 378 560	24 938 377	99 281 523
Gross Output (£m. 1970)	11. 74	44. 40	22. 36	20. 41	86. 48	340. 82	22. 26	3871. 56	119. 98	69. 74	1539. 01	(1915. 8)	1915. 8	(6145. 46)
Implicit Intensity (K thermies/£m)	19 186	9 486	50 633	155 021	20 379	13 550	44 883	6. 127	46 816	70 909	10 629	5 939	13 017	(16 155)

(h) 1985 Summary Table

10^3 Thermies

	Iron & Steel	Non-ferrous Metals	Glass	Cement	Other Building Materials	Chemicals	Pulp & Paper	Other Industries	Land Transportation	Sea, Air Transportation	Other Services	Private Transportation	Other household uses (inc. heating)	Total
1(a) Coal	2,604	491	892	1 182 374	115 530	7 934	-	450 135	-	-	-	-	6 774 017	
1(b) Turf	-	-	-	-	-	198	46 657	252 137	-	-	-	-	4 006 152	
2 Coke	2 442	-	-	-	-	16	-	-	-	-	-	-	-	
3 Gas	-	510	163 847	-	12 498	14 242	-	785 302	-	-	658 991	-	2 228 912	
4 Carburants	-	-	-	-	-	-	-	-	617 419	5 904 178	-	13 109 152	-	
5 Gas oil/dom. fuel oil (incl. diesel)	285	-	-	17 467	86 479	70 415	917	5 591 859	6 771 001	218 651	24 926 815	-	16 559 215	
6 Heavy fuels	188 716	168 003	1 131 192	2 199 183	1 606 955	4 247 148	933 487	16 244 010	-	-	-	-	-	
7 Naphtas	-	-	-	-	-	-	-	-	-	-	-	-	-	
8 Hydrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	
9 Electricity	90 212	318 439	86 894	474 287	257 580	1 377 414	71 587	5 574 211	-	-	-	-	2 733 537	
	284 259	487 443	1 382 825	3 873 311	2 079 042	5 717 367	1 052 648	28 897 654	7 388 420	6.122 829	25 585 806	13 109 152	32 301 833	128 282 586
Gross Output (£m 1970)	13.04	49.51	27.40	25.02	105.99	416.72	24.11	4766.29	142.87	79.90	2012.6	(2314.32)	2314.32	(7663.45)
Implicit Intensity (k thermies/£m)	21 799	9 845	50 468	154 809	19,615	13 720	43 660	6 063	51 714	76 631	12 713	5 664	13 957	(16 740)

(i) Comments on the projections

The original intention in projecting energy demand was to use efficiencies (namely output per unit of energy) extrapolated over time, to project total energy consumption for each industry. This would then have served as a control total to which the individual fuel projections would be scaled. This method may have been appropriate for Germany and France where efficiencies have in general been rising. In Ireland the efficiencies have been either too erratic to project, or falling, as shown by the following table. The results of using the efficiencies to project energy consumption are also given.

Sector	Trend of energy efficiency over the period 1962-1973 Time Trend	Resulting Energy Projection
Iron & Steel	-	Negative
Other non-ferrous metals	- exponential	4 x 1985 sum of components
Glass	(- +) unsatisfactory trend	None
Cement	- exponential	7 x 1985 sum of components
Other Build.mats.	(+) unsatisfactory trend	None
Chemicals	-	Negative
Paper & Pulp	-	1.2 X 1985 sum of components
Other industries	unsatisfactory trend	None
Land Transport	-	$1\frac{1}{2}$ x 1985 sum of components
Sea & Air Transport	-	Negative
Other services	- exponential	computer overflow
Private transport		
Other household uses	(- +) unsatisfactory trend	None

It is clear that while a country is industrialising such as Ireland was, it is replacing men by machines and output is becoming more energy intensive, that is energy efficiency is falling. However, when a nation is industrialised, such as Germany, its second generation machines may be more energy efficient. We cannot tell whether Ireland's energy efficiency will fall, remain static or rise in the next few years, but the table shows clearly that the 1962-1973 trends cannot continue to 1985.

This calls into question the validity of the projections of the individual fuels as well. Although these were related to such explanatory variables as gross output and price rather than simply to time, there is still a major problem of possible future changes in energy efficiency which price rises cause. It is not clear to what extent the price-induced raising of energy efficiency will outweigh the industrialisation-induced lowering of energy efficiency. Meanwhile, testing the 1962-1973 demand relationships to "project" to 1977 and comparing the results with the actual 1977 energy consumption figures, gives some indication. This was done for the industrial sectors and 'projects' a rise in energy consumption of 8.87 per cent between 1973 and 1977. The actual rise during this period was 6.35 per cent for all energy consumption. Without further evidence one is led to suspect that if sustained energy price rises occur the energy projections for 1980 and 1985 will overstate demand.